COMPARATIVE STUDY BETWEEN DEXMEDETOMIDINE AND MEPERIDINE IN THE PREVENTION OF INTRAOPERATIVE SHIVERING IN PATIENTS UNDERGOING LOWER ABDOMINAL SURGERIES UNDER SPINAL ANESTHESIA

Dissertation submitted
in the partial fulfillment of the requirements
for award of the degree

M.D (Anaesthesiology)
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CHENNAI, TAMIL NADU

APRIL 2016

CERTIFICATE

This is to certify that this dissertation entitled "**COMPARATIVE STUDY BETWEEN DEXMEDETOMIDINE AND MEPERIDINE IN THE PREVENTION OF INTRAOPERATIVE SHIVERING IN PATIENTS UNDERGOING LOWER ABDOMINAL SURGERIES UNDER SPINAL ANESTHESIA"** submitted by **Dr. AMUDHAVAN S** in partial fulfillment for the award of the degree Doctor of Medicine in Anaesthesiology by The Tamilnadu Dr. M.G.R. Medical University, Chennai is a bonafide work done by him at Government Kilpauk Medical College, Chennai during the academic year 2013-2016.

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Prof .Dr. T. Murugan, M.D.,D.A.,
Professor & HOD,
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Chennai-10.

DECLARATION

I, **Dr. AMUDHAVAN S** solemnly declare that this dissertation, entitled "**COMPARATIVE STUDY BETWEEN DEXMEDETOMIDINE AND MEPERIDINE IN THE PREVENTION OF INTRAOPERATIVE SHIVERING IN PATIENTS UNDERGOING LOWER ABDOMINAL SURGERIES UNDER SPINAL ANESTHESIA"**, has been prepared by me, under the expert guidance and supervision of Prof. Dr. T. Murugan, M.D., D.A Professor and HOD, Department of Anaesthesiology, Government Kilpauk Medical College and Hospital, Chennai and submitted in partial fulfillment of the regulations for the award of the degree M.D.(Anaesthesiology) by The Tamil Nadu Dr. M.G.R. Medical University and the examination to be held in April 2016.

This study was conducted at Government Kilpauk Medical College Hospital, Chennai. I have not submitted this dissertation previously to any university for the award of any degree or diploma.

Place: Chennai (DR.S.AMUDHAVAN)

Date:

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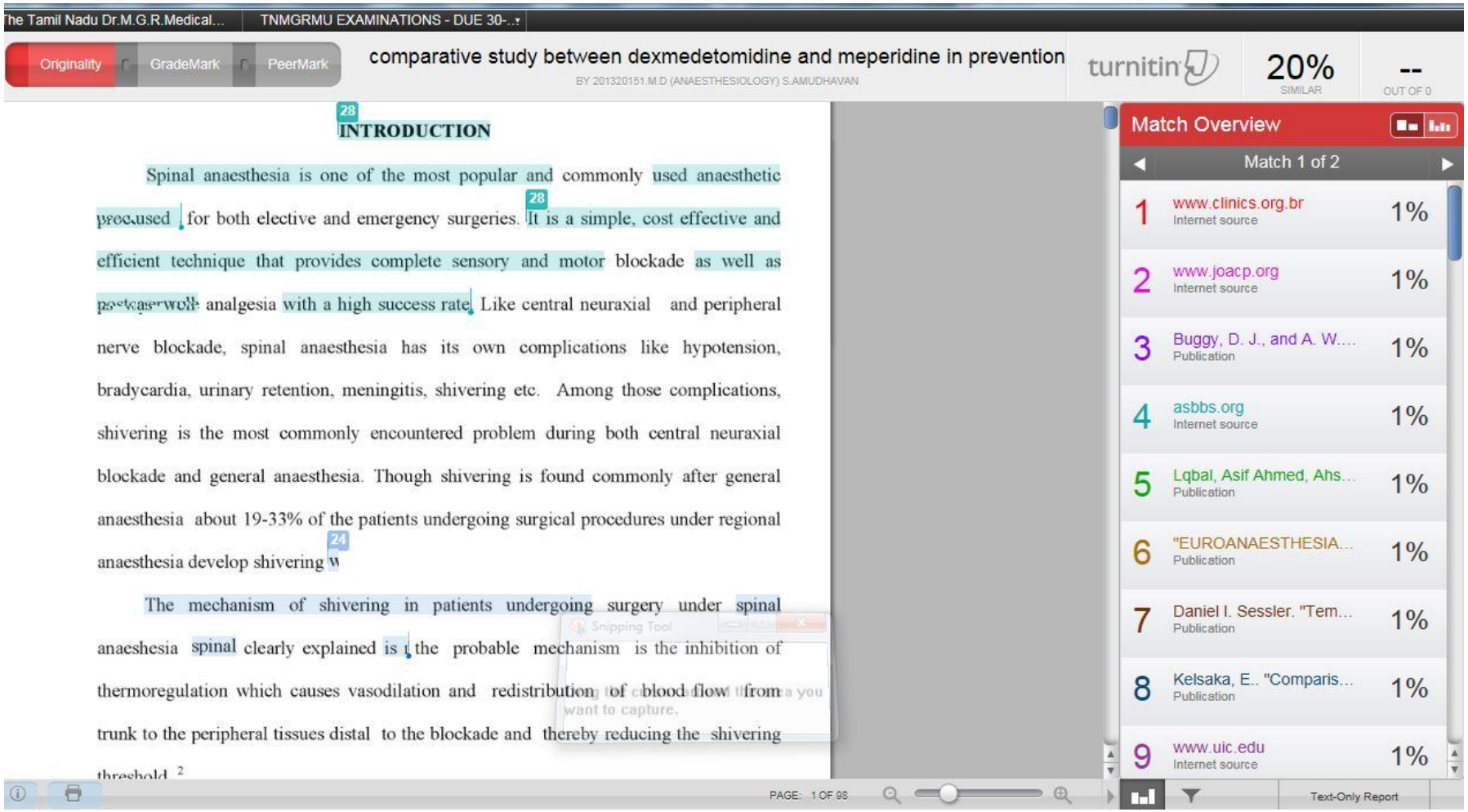

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INTRODUCTION

Spinal anaesthesia is one of the most popular and commonly used anaesthetic procedures for both elective and emergency surgeries. It is a simple, cost effective and efficient technique that provides complete sensory and motor blockade as well as postoperative analgesia with a high success rate. Like central neuraxial and peripheral nerve blockade, spinal anaesthesia has its own complications like hypotension, bradycardia, urinary retention, meningitis, shivering etc. Among these complications, shivering is the most commonly encountered problem during both central neuraxial blockade and general anaesthesia. Though shivering is listed commonly after general anaesthesia about 19-33% of the patients undergoing surgical procedures under regional anaesthesia develop shivering.[1]

The mechanism of shivering in patients undergoing surgery under spinal anaesthesia is not clearly explained but the probable mechanism is the inhibition of thermoregulation which causes vasodilation and redistribution of blood flow from trunk to the peripheral tissues distal to the blockade and thereby reducing the shivering threshold.[2]

Shivering is a very unpleasant and physiologically stressful symptom for the patients undergoing surgery and it occurs in various frequencies as a thermoregulatory response to hypothermia or muscle activity with acute or chronic patients. Shivering obstructs intraoperative monitoring like ECG, SPO2, blood pressure monitoring and also

CONTENTS

ABSTRACT:

BACKGROUND:

Shivering is a most commonly encountered problem during both intraoperative and post operative period. It increases the oxygen consumption significantly so it can be detrimental to patients with poor cardiac reserve and also increases intracranial pressure and intraocular pressure. The present study evaluated the efficacies of dexmedetomidine and meperidine in the prevention of intraoperative shivering in patients undergoing lower abdominal surgeries under spinal anaesthesia

METHODS:

A total of 80 adult patients aged 18 to 60 years with American society of Anaesthesiologist physical status I and II of both the gender were randomized to two groups. In that group D will receive Inj.Dexmedetomidine 0.5 mics/kg in 100 ml normal saline over a period of 10 minutes and group M will receive Inj.Meperidine 0.5 mg/kg in 100 ml normal saline just after giving subarachnoid block with 3.5 cc of 0.5 % hyperbaric bupivacaine . Heart rate, mean arterial pressure, SpO2, temperature, shivering grade will be monitored for every 5 minutes till the end of surgery. Sedation score and respiratory rate will be monitored every 10 minutes till the end of surgery.

RESULTS:

Both dexmedetomidine and pethidine were effective in preventing the intraoperative shivering. Out of 80 patients 4 patients in mepridine group and 3 patients in dexmedetomidine group had shivering in almost similar grade. The sedation score was more with dexmedetomidine group with less incidence of nausea and vomiting when compared to the pethidne group. There was no statistically significant variation in haemodynamics in both the groups.

CONCLUSION:

Intravenous administration of dexmedetomidine and meperidine was effective in prevention of shivering in patients undergoing lower abdominal surgeries under spinal anaesthesia. Dexmedetomidine produces lesser side effects

like nausea and vomiting with more sedation without causing respiratory depression when compared with pethidine. So dexmedetomidine can be used as an effective drug in prevention of intraoperative shivering

KEYWORDS:

Subarachnoid block, shivering, sedation, meperidine and Dexmedetomidine.

INTRODUCTION

Spinal anaesthesia is one of the most popular and commonly used anaesthetic procedures for both elective and emergency surgeries. It is a simple, cost effective and efficient technique that provides complete sensory and motor blockade as well as postoperative analgesia with a high success rate. Like general anaesthesia and peripheral nerve blockade, spinal anaesthesia has its own complications like hypotension, bradycardia, urinary retention, meningitis, shivering etc. Among those complications, shivering is the most commonly encountered problem during both central neuraxial blockade and general anaesthesia. Though shivering is found commonly after general anaesthesia about 19-33% of the patients undergoing surgical procedures under regional anaesthesia develop shivering[1].

The mechanism of shivering in patients undergoing surgery under spinal anaeshesia is not clearly explained but the probable mechanism is the inhibition of thermoregulation which causes vasodilation and redistribution of blood flow from trunk to the peripheral tissues distal to the blockade and thereby reducing the shivering threshold[2].

Shivering is a very unpleasant and physiologically stressful symptom for the patients undergoing surgery and it occurs in various frequencies as a thermoregulatory response to hypothermia or muscle activity with tonic or clonic patterns. Shivering obscures intraoperative

monitoring like ECG, SPO2, blood pressure monitoring and also increases the intraocular and intracranial pressure[3,4,5]. It can be detrimental to patients with low cardio-respiratory reserve since it increases oxygen demand and consumption, produce arterial hypoxemia, lactic acidosis. Some patients find the accompanying cold sensation to be worse than the surgical pain.

Various methods are available for the control of shivering during anaesthesia. Non-pharmacological methods like electrical heaters, radiant warmers are being used to maintain normothermia. But the equipments used to maintain normothermia may not be practical in all the settings[6]. Drugs like pethidine[meperidine], tramadol, clonidine, nefopam, ketamine have been tried to prevent/treat shivering during spinal anesthesia. Many drugs have been found effective in controlling shivering but most of them produced significant adverse effects like nausea, vomiting and respiratory depression.

This resulted in finding an alternate drug for control of shivering. Dexmedetomidine (highly selective α_2 agonist) is a new drug approved for sedation of critically ill or injured patients in intensive care unit. It produces sedation, anxiolysis, hypnosis, analgesia, sympatholysis and has anti shivering properties. Since it has got lesser side effects than other antishivering agents, this study is conducted to find the effectiveness of dexmedetomidine in the prevention of shivering.

AIMS & OBJECTIVES

1. To study and compare the effectiveness of dexmedetomidine and meperidine in the prevention of intraoperative shivering in patients undergoing lower abdominal surgeries under spinal anesthesia.

2. To study the side effects of the drugs.

REVIEW OF LITERATURE

Thermoregulation

The central regulation of body temperature is by feedback mechanisms that operate predominantly through the preoptic nucleus of anterior hypothalamus. This area integrates afferent inputs from thermo receptors in skin, deep tissues and spinal cord. However, now it is known that considerable modulation of afferent thermoregulatory input occurs in the brain stem and spinal cord before arrival in hypothalamus.

There are three components involved in the processing of thermoregulatory response (Figure 1) which includes:

1. Afferent thermal sensing,
2. Central regulation (Figure 2) and
3. Efferent responses.

These three components work together to maintain normal core body temperature[7,8,9]. General anaesthesia affect all the three components and regional anaesthesia affect the afferent and efferent components which is responsible for the occurrence of perioperative hypothermia.

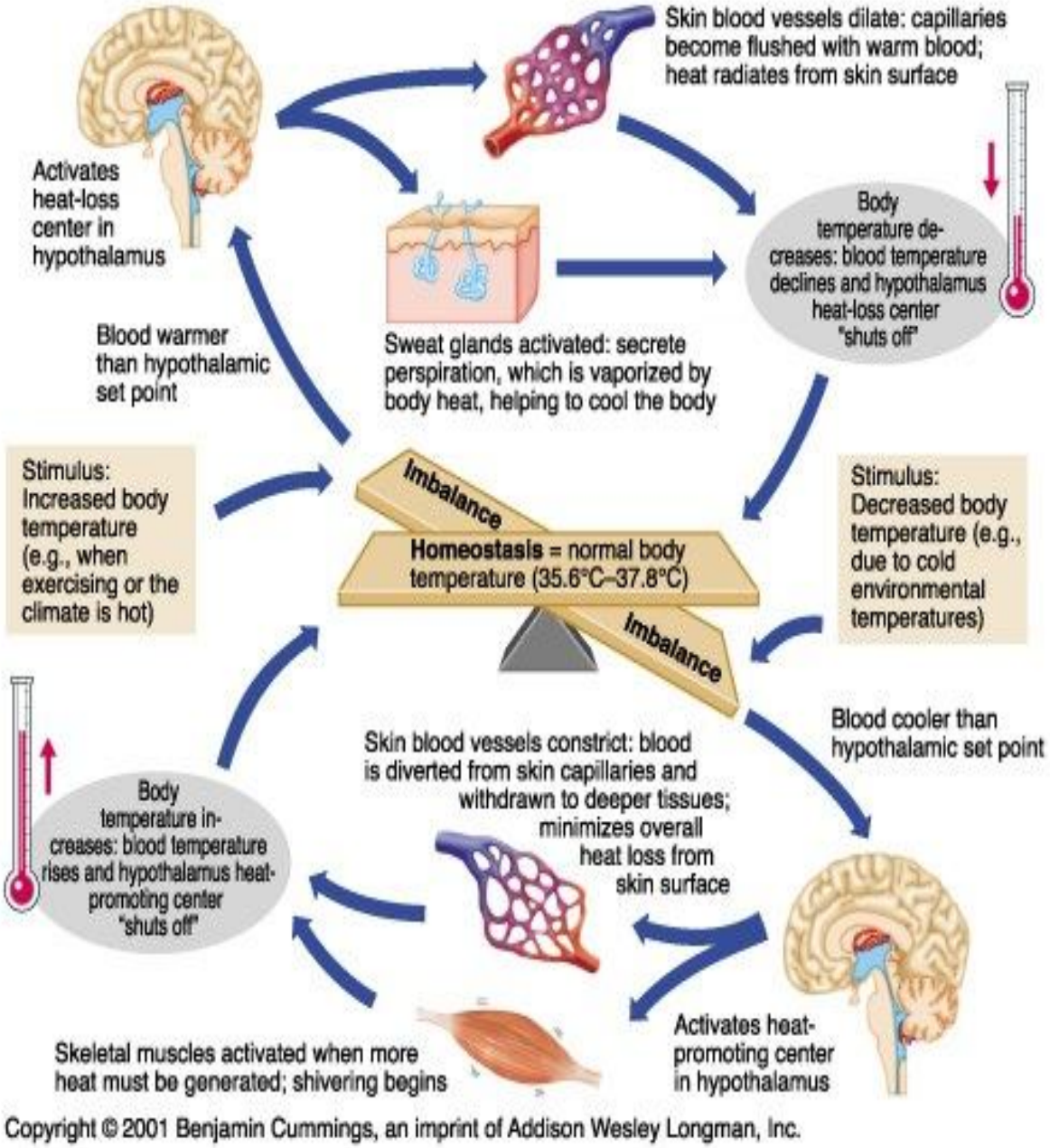

Figure 1: Physiology of thermoregulation

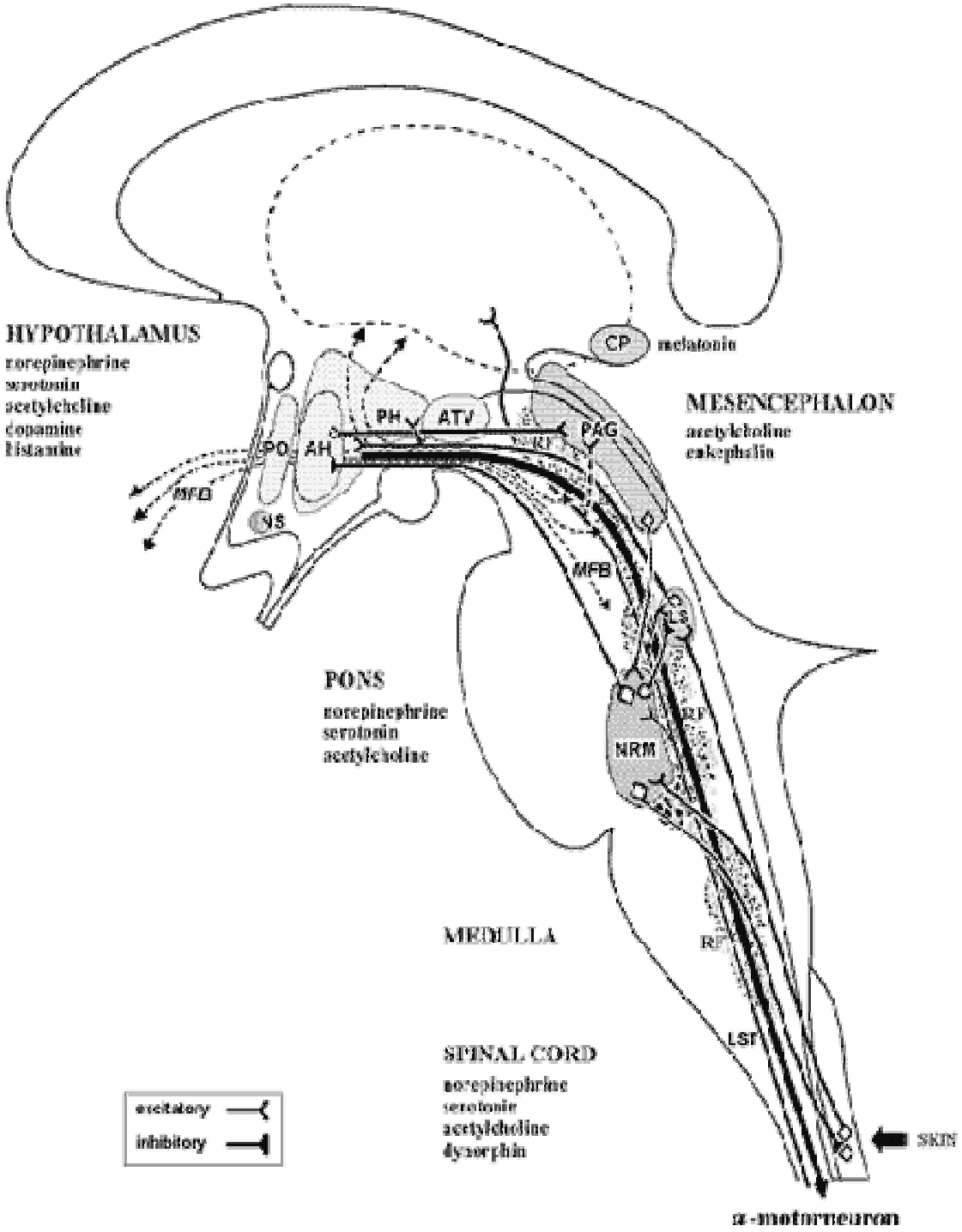

Figure 2: Neural pathway for shivering

Afferent thermal sensing

Information on temperature is obtained from thermally sensitive cells throughout the body. Thermoreceptors are of two types namely warm sensory receptors and cold sensory receptors. These receptors are responsible for sensing cold and warm temperatures and are located both centrally as well as peripherally. Cold signals are carried by the A delta fibres and warm signals by unmyelinated C fibres[10]. These thermal signal reaches hypothalamus (the central thermoregulatory centre) via the lateral spinothalamic tract. Before reaching the hypothalamus, these signal gets integrated and modulated at the level of the spinal cord. Signal from cold receptors which travel via the delta fibres have a peak discharge of impulses at temperature between 25°C to 30°C, whereas signal from warm receptors which travel via unmyelinated C fibres have a maximal discharge at 45°C to 50°C. In addition, there are also central cold receptors whose anatomical location is uncertain.

Peripheral cold sensory receptors are more effective when compared to central cold thermoreceptors. Studies conducted in spinal cord transection patients have showed that thermoregulatory central process is less sensitive when compared to peripheral thermoreceptor. These central thermo receptors become active when the temperature set point falls below its level.

Anterior spinothalamic tracts in the spinal cord transmit most of the thermal sensation to the brain. No single tract is responsible for transmitting whole of thermal sensation. Hence to completely abolish thermal sensation we need to destroy the whole of anterior spinal cord. Spinal cord acts as a gateway at multiple levels for sensing and modifying the thermal signals before reaching the hypothalamus which is the primary thermoregulatory control in mammals.

Before reaching the hypothalamus few areas in brain stem such as sub coeruleus and the raphe magnus nucleus acts as a relay station for transmitting thermal information from skin. Roughly about 20% of the total thermal input comes from various structures like hypothalamus, spinal cord, skin surface, deep abdominal and thoracic tissues to the central regulatory system[12].

The Subcoeruleus area and Nucleus Raphe Magnus

The locus subcoeruleus contains numerous noradrenergic neurons and it is located ventromedial to the locus coeruleus in pons. The raphe magnus nucleus situated in the medulla contains large amount of thermoresponsive (predominantly warm responsive) serotonergic neurons[14].

Central regulation

The dominant autonomic thermoregulatory controller in mammals is the preoptic region of the hypothalamus. The anterior hypothalamus is responsible for integration of afferent thermal information, whereas the posterior hypothalamus mainly controls the descending pathways to the effectors. The temperature sensitive and insensitive neurons are situated in the pre-optic area of hypothalamus. The temperature insensitive neurons respond to non thermal information such as plasma osmolality, reproductive hormones, glucose concentration, BP (Blood Pressure), noxious stimuli, CO2 and emotional stimuli. The temperature sensitive neurons are divided into heat and cold responsive neurons. The heat responsive neurons in the preoptic area are about four times higher than the cold sensitive neurons. The heat responsive neurons increase their discharge rate and activate heat loss mechanism in response to increased local heat. Cold responsive neurons get triggered when cold sensation from skin reaches the hypothalamic preoptic area.

The hippocampus connects the limbic system (emotion, memory, and behaviour) to thermoregulatory responses by delivering much of excitatory inputs to the warm responsive neurons. Warm responsive neurons compare all the non thermal and thermal inputs from spinal cord with the local information and it also senses the core temperature. Though the thermal informations are integrated by hypothalamus, most of them

are pre processed in spinal cord and other parts of central nervous system before reaching the hypothalamus.

The body temperature varies during sleep and circadian rhythm mainly due to the changes in the activity of neurons in the ascending reticular activating system and suprachiasmatic nucleus which modulates the thermoregulatory centre in the hypothalamus[13,14].

The gain of thermoregulatory response was defined as the slope of response between intensity and core temperature. The response intensity which is no longer increasing with further deviation in core temperature identifies the maximum intensity. This system of gains and thresholds is a model for a thermoregulatory system which is complicated by interactions between other thermoregulatory responses such as vascular volume control and time dependent effects.

The four neural mechanisms responsible for autonomic thermoregulation are:

1. Peripheral detection of cold
2. Central detection of warmth
3. Inhibition of thermoregulatory sweating by cooling of skin
4. Central warm inhibition of metabolic response to cold

The mechanism for the absolute threshold temperature determined by the body is largely not known, though the mechanism appears to be mediated by the chemical mediators like norepinephrine, acetylcholine, 5-

HT, dopamine, neuropeptides and prostaglandin E1. Thresholds vary daily in both sexes (circadian rhythm) and monthly in women during menstruation by approximately 0.5°C. Exercise, food intake, infection, hyperthyroidism, hypothyroidism, anaesthetic and other drugs, cold and warm adaptation etc alter threshold temperatures.

Approximately 80% of control of autonomic response is determined by thermal input from core structures[15]. But in contrast, a large fraction of behavioral response is derived from skin surface. The inter threshold range (core temperature not triggering autonomic thermoregulatory responses) is only 0.4°C (36.7°C to 37.1°C).This threshold has vasoconstriction at its lower end and sweating at its upper end . During general anaesthesia in volunteers this inter-threshold may be increased up to 4.0°C.

The vasoconstriction and sweating thresholds (Figure 3) are 0.3°C-0.5°C higher in women than men. In women, it is even higher in the follicular phase of menstrual cycle[16] and also shows greater differences in luteal phase [17]. In premature neonates, central thermoregulatory control is somewhat intact when compared to elderly[18].

Efferent responses

Multiple inputs received in the effector system are integrated into a common efferent signal. Effector mechanisms are in an orderly fashion, ensuring optimal regulation in both animals and humans. The body

responds to thermal perturbations by activating effector mechanisms that acts by altering the environmental heat loss or increasing the metabolic heat production. Each thermoregulatory effector has its own threshold and gain and so there is an orderly progression of responses and response intensities in proportion to the need[7].

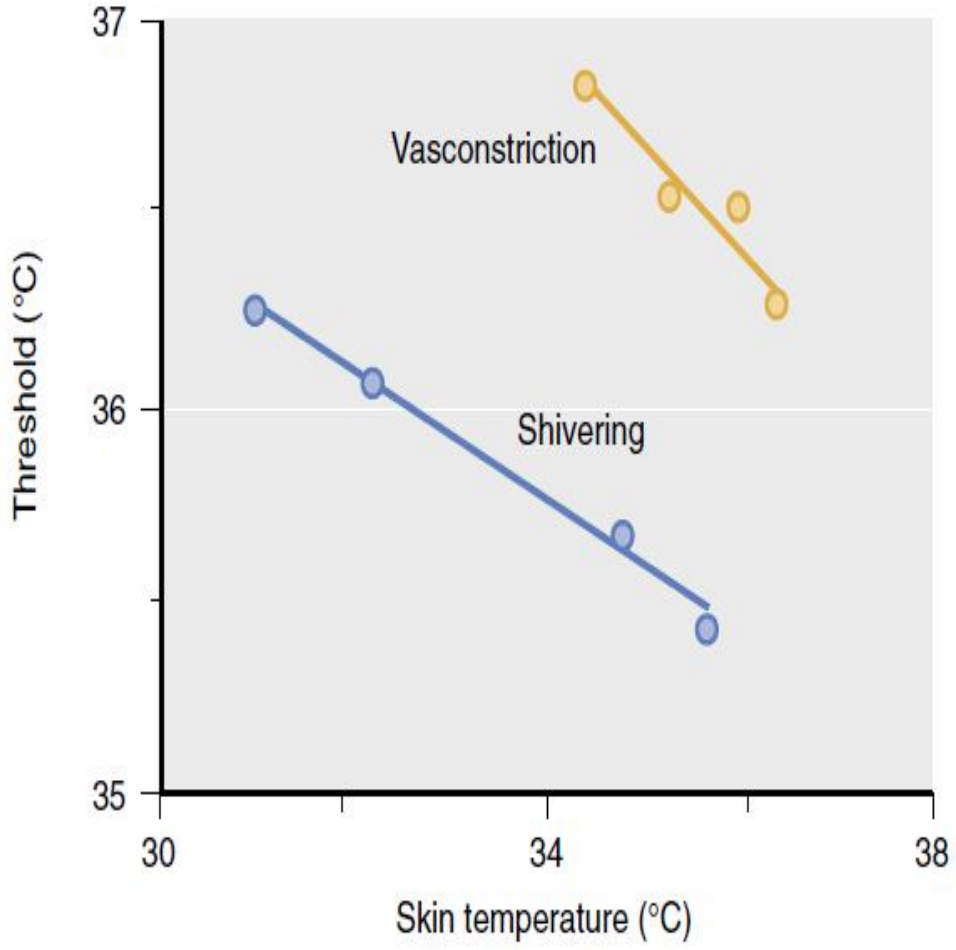

Figure 3: Relationship between core temperature and mean skin temperature triggering shivering and vasoconstriction

The thermoregulatory responses (Figure 4) are characterized by:-

1. Altered behaviour, quantitatively the most effective mechanism.
2. Vasomotor response, consisting of vasodilatation, sweating in response to heat and vasoconstriction and piloerection in response to cold.
3. Shivering and increase in metabolic rate[7].

For a given individual, at specific temperature the activation of thermoregulatory effector response is triggered. Behaviour modification plays a powerful role in regulating body temperature in conscious individuals when compared to the autonomic regulatory mechanisms.

When an excessively cool body temperature is sensed by the hypothalamus and from there the impulses reaches the cerebral cortex giving cold sensation to the individual. It results in behavior modifications like increased motor activity, adding clothing or moving to warmer surroundings[7].

The autonomic effector responses are activated when the set point temperature range of 36.7°C to 37.1°C is breached . Each of the specific responses has a characteristic threshold, gain and maximum response intensity.

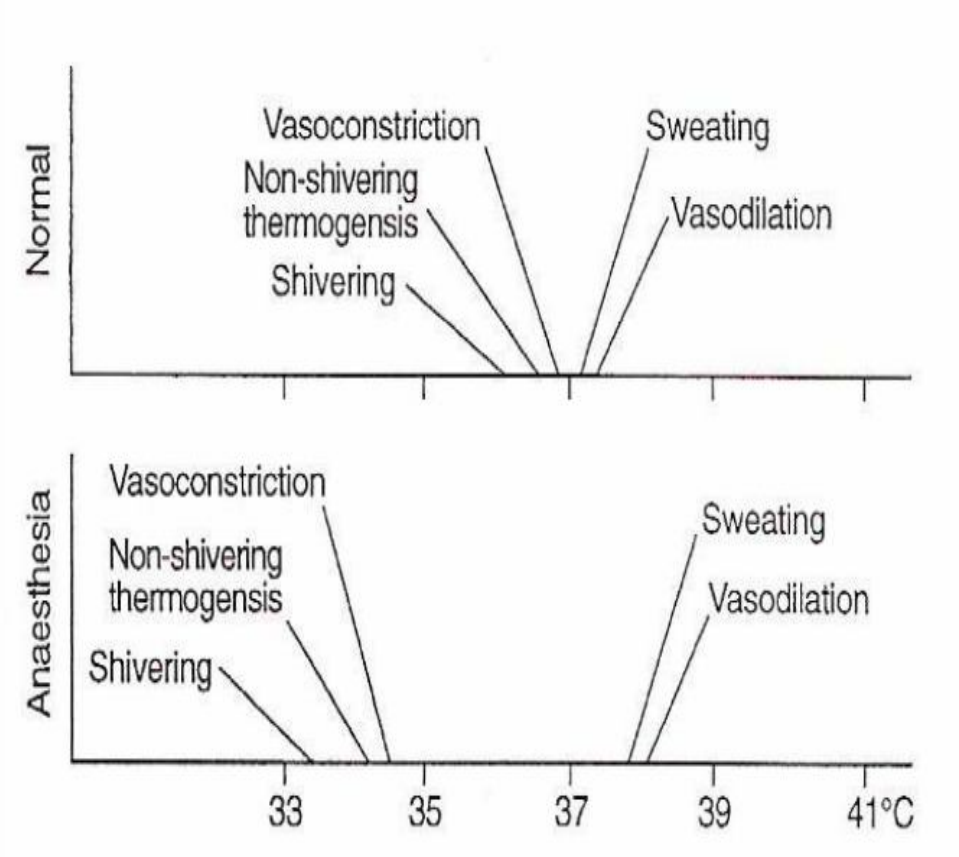

Figure 4: Thermoregulatory effector responses at specific temperatures in Normal and anaesthetised individuals

Cutaneous vasoconstriction is the most consistently used autonomic effector mechanism. Heat loss is normally regulated by vasomotor changes like cutaneous vasoconstriction and vasodilation without the major responses like sweating or shivering.

Thermoregulatory cutaneous vasoconstriction preserves metabolic heat and thereby preventing the decrease in body temperature. Shivering is the last defence that is activated only when behavioural compensation and maximum A-V shunt vasoconstriction are insufficient to maintain core temperature. Metabolic heat is lost primarily through convection

and radiation from the skin surface, vasoconstriction reduces this loss. The digital blood flow in total is divided into thermoregulatory (mostly A-V shunt) vasoconstriction and nutritional (mostly capillary)[7].

The central temperature system has biologic rhythms. Fluctuations in core temperature occur daily with the lowest temperatures occurring in the early hours of morning in relation to melatonin secretion. These circadian rhythms can produce variation of up to 1.5°C.

Shivering

Shivering is an involuntary, oscillatory muscular activity which augments metabolic heat production up to 600% above baseline. However, a doubling of metabolic heat production is all that can be sustained over long periods. The electromyographic study in humans showed that the fundamental tremor frequency to be around 200 Hz. Further, it also indicated that the tremor had a 4–8 cycles/ min, waxing-and-waning pattern (Figure 5)[14].

When the cold stimulus reaches preoptic region, the efferent signals passed along the medial forebrain bundle which resulted in shivering. The posterior hypothalamus is inhibited by the preoptic-anterior hypothalamus in order to suppress shivering. The central descending pathway of shivering was thought to arise from the posterior hypothalamus. It is yet to be determined whether the synaptic inputs for

the reticulospinal neurons are from the posterior hypothalamus or from the preoptic-anterior hypothalamus[14].

The final common pathway for both the shivering and coordinated movement is through the spinal motor neurons and their axons. The electromyography showed a specific rhythm for cold tremors in the form of grouped discharges. The excitability of motor neurons is inversely proportional to cell size. The motor neurons are recruited in the sequence of increasing size when there was a continuous cold stimulus to the skin or spinal cord.

During shivering, the larger motor neurons show synchronized discharges than the smaller ones which is due to the recurrent inhibition of Renshaw cells(a group of inhibitory interneuron)[14].

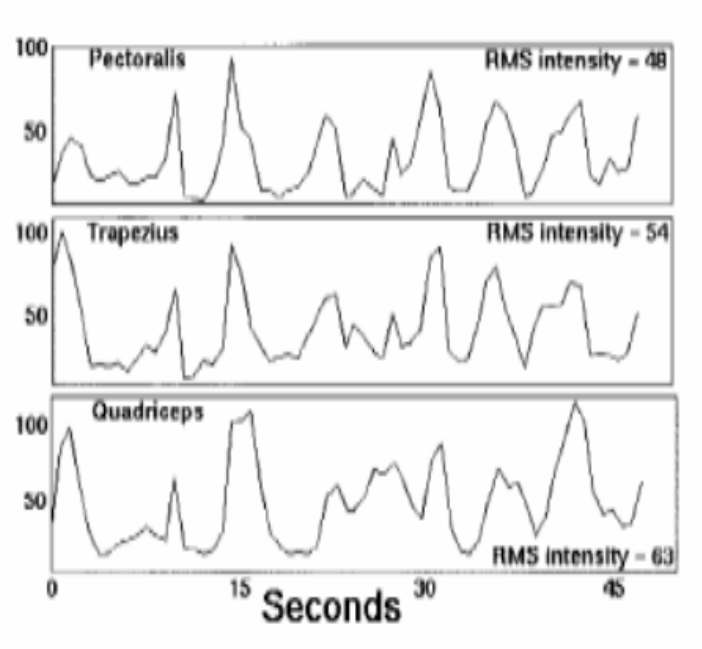

Figure 5: Patterns of shivering (waxing and waning).

Thermoregulation during general anaesthesia

Major disturbances in thermoregulation are observed during and after general anaesthesia. The inductions of general anaesthesia impair the function of neurons in the preoptic nuclei and hypothalamus, thereby reducing the temperature at which activation of responses to hypothermia usually occurs. Behavioural adaptations are not relevant in a patient under general anaesthesia who is unconscious and frequently paralysed. All general anaesthetics tested markedly inhibit autonomic thermoregulatory control. Anesthetic induced thermoregulation slightly elevates the warm response and markedly reduces cold response threshold. The inter-threshold range is increased from its normal value of near 0.2°C to approximately 2°C-4°C. The gain and maximum intensity of some responses remain normal, whereas others are reduced by general anesthesia[7].

Thermoregulation during regional anaesthesia

Epidural and spinal anaesthesia alter the thermoregulatory response by decreasing the vasoconstriction and shivering threshold to a comparable degree (by 0.6°C) to general anaesthesia, but to a lesser amount than when measured at the level above the upper level of the block.

In regional anaesthesia, the gain and maximum intensity of shivering response is reduced by 63% and 33% respectively. But in case

of general anaesthesia the gain of thermoregulatory responses is unchanged. This occurs because shivering above block compensates for the inability of muscle group below the level of blockade to engage in shivering. As with general anaesthesia, during first hour of epidural anaesthesia core temperature decreases by 0.6-1.5°C due to core-to-peripheral distribution of heat due to epidural induced vasodilatation. However, with prolonged epidural anaesthesia, it was observed that the degree of core hypothermia is less than that of general anaesthesia. This is explained by the fact that vasoconstriction above the block compensates for heat losses in regional anaesthesia[7].

Shivering during regional anaesthesia is similar to that occurring after general anaesthesia and is preceded by core hypothermia and vasoconstriction above the blockade level. It has the same electromyography characteristics as that of shivering which occurs after general anaesthesia. With reduced gain and maximum intensity, the shivering which is induced by core hypothermia following regional anaesthesia is usually ineffective in preventing core hypothermia. Whether shivering observed following regional anaesthesia during labour is due to the temperature of the injectate is unclear. Incidence of shivering was significantly lower in parturients who received pre warmed local anesthetic when compared to cold local anesthetic. These results could not be demonstrated in non pregnant individuals.

Interestingly, core hypothermia during regional anaesthesia (Figure 6) may not trigger a sensation of cold. This may reflect the fact that subjective cold perception depends on skin temperature afferent input, and that cutaneous vasodilatation resulting from regional anaesthesia increases skin temperature, leading to sensation of warmth although accompanied by thermoregulatory shivering. Awareness of core hypothermia is also impaired by epidural anaesthesia. During induction of general and regional anaesthesia the body heat is redistributed from the core to periphery and subsequent development of hypothermia depends on balance of cutaneous heat loss and rate of metabolic heat production[7].

Patterns of intraoperative hypothermia

Hypothermia during general anaesthesia has a characteristic pattern which include 3 phases namely,

1. Initial rapid decrease.
2. Slow linear reduction.
3. Stabilization of core temperature.

The final plateau phase may be a passive thermal steady state and triggers thermoregulatory vasoconstriction when sufficient hypothermia develops.

Temperature monitoring should be accurate in determining temperature. Mercury-in-glass thermometers which were used earlier were slow and cumbersome and so, now they are replaced by electronic

thermometers. The most commonly used systems are thermistors and thermocouples. Both these devices are accurate and are inexpensive. Infrared monitors used for tympanic membrane temperature monitoring from outer ear are also available. Due to variation in the core body temperature during the perioperative period there will be variation in the temperatures measured at various body site. Core temperature can be monitored at nasopharynx, tympanic membrane, distal part of the oesophagus, and pulmonary artery. The core thermal compartment contains highly perfused tissues whose temperature is high when compared to rest of the body. Core temperature can be measured with reasonable accuracy using oral, rectal, axillary and bladder temperatures also.

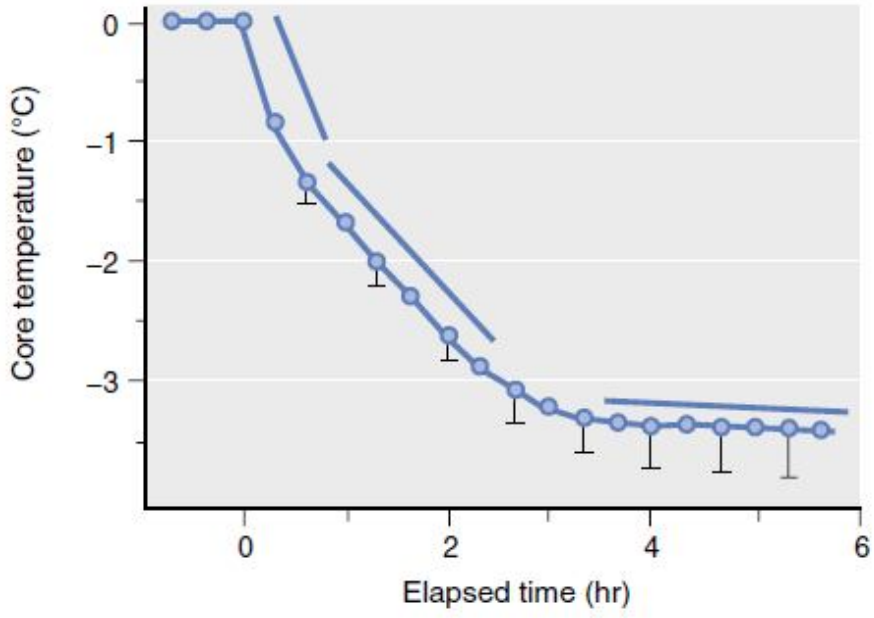

Figure 6 : Core temperature after administration of anaesthesia.

Temperature monitoring

Complications of hypothermia and shivering

Complications of hypothermia and shivering include increased blood loss & reversible coagulopathy, increased blood transfusion, impaired wound healing, increased risk of infection, delayed drug metabolism, left shift of haemoglobin – oxygen dissociation curve, altered mental status, cardiac arrhythmias and Ischemia, increased peripheral vascular resistance, increased myocardial oxygen consumption, increased basal metabolic rate and monitoring artifacts showing aberrant values[20,21,22].

Measures to combat shivering

Measures which reduce core hypothermia in turn reduce anaesthesia induced shivering. They include:

1. Passive insulators

Passive insulators include cotton blankets, cloth or paper surgical drapes, disposable plastic drapes and plastic bags. Passive insulators reduce heat loss to environment. Heat conservation is proportional to the area of body covered. A single layer of each type of covering material decreases heat loss by approximately 30%. Unfortunately adding additional layers does not proportionately increase the benefit. However, this is not beneficial in long and extensive surgeries[7].

2. Active warming

Convection warming system use warmed air that is forced through a quilt like porous blanket over the skin, warming it directly and also replacing the normal body "air envelope" with a warm air envelop (Bair Hugger Unit).This is the most effective system for conservation of body heat. Radiant heat system like infra red light, thermal ceiling lights can be used for warming the body. Other measures like warming inspired air, warming intravenous fluids, blood and blood components before infusion, maintaining warm post-operative environment are useful in preserving body temperature and reducing shivering[7].

3. Pharmacotherapy

Many drugs like tramadol, pethidine, nefopam, ketanserine, ketamine, fentanyl, clonidine and dexmedetomidine have potent anti-shivering properties. These drugs belongs to several classes like biogenic monoamines, endogenous peptides, cholinomimetics, endogenous peptides and possibly N-Methyl-D- Aspartate (NMDA) antagonist, 5HT, noradrenaline receptor antagonists. All these drugs exert their action by modulating the central thermoregulatory control mechanisms. The normal functions of these drugs are diverse and the predominant site of action of most of these drugs are yet to be identified[7].

Meperidine decreases the shivering threshold almost twice as much as the vasoconstriction threshold and is more effective than that of pure μ

receptor agonists in the treatment of shivering. The antishivering activity of meperidine is also partially mediated by κ opioid receptors. Magnesium sulphate is a physiologically occurring NMDA receptor antagonist and has anti shivering properties. Ketamine is another competitive NMDA receptor antagonist, shown to be effective against shivering. Clonidine and Dexmedetomidine are α_2 receptor agonists, used for the prevention of shivering. Recently, granisetron an anti emetic drug whose role in prevention of shivering is under study.

DEXMEDETOMIDINE

It is a selective α_2 agonist which produces sedation, anxiolysis, analgesia and also possess sympatholytic property. Because of these properties, dexmedetomidine has made its use in perioperative period and for sedation of patients admitted in intensive care unit. It also has got anti shivering property. Various studies are being conducted to find out the effectiveness of dexmedetomidine in control of shivering.

Physical and chemical properties:

Dexmedetomidine (Figure 7) is a d-enantiomer of medetomidine, belonging to the imidazole subclass of α_2 receptor agonists. It is highly water soluble. It has a high specificity for α_2 receptor (α_2:α_1 1600:1), when compared to clonidine [α_2:α_1 200:1]. Its pka is about 7.1.

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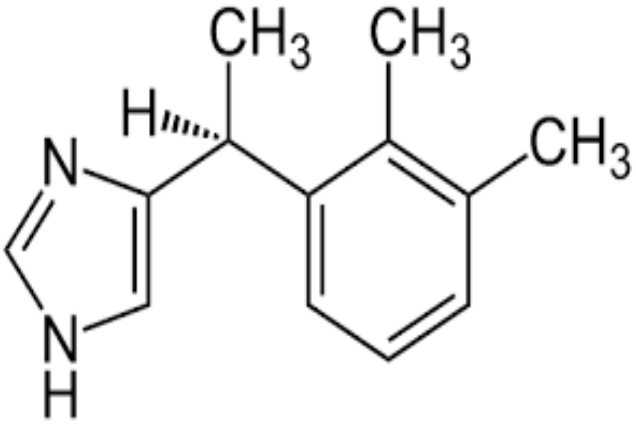

Figure 7: Dexmedetomidine chemical formula and vial

Pharmacokinetics:

Dexmedetomidine is administered intravenously as infusion. It is a dextroisomer of medetomidine and is short acting with linear concentration dependent kinetics.

Dosing and Administration:

Desirable pharmacodynamic effects are observed at a plasma concentration of 0.5-1.2 ng/ml. The dosing regimen approved by FDA in 1999 is a loading dose of 1 µg/kg administered over a period of 10 minutes followed by continuous intravenous infusion at a rate of 0.2 to

0.7µg/kg/hr. The rate of intravenous infusion should be titrated according to the desired level of sedation. The FDA approved duration of infusion is 24 hours for ICU sedation. Dexmedetomidine when administered for less invasive procedure like ophthalmic surgeries is given at a loading dose of 0.5 µg/kg over 10 minutes followed by a maintenance infusion which is started at 0.6 µg/kg/hr and titrated to achieve desired clinical effects.

Distribution:

The pharmacokinetics of Dexmedetomidine is commonly described using a two-compartment model. It is rapidly distributed after administration with a distribution half life of 6 minutes. The terminal elimination half life is approximately 2 – 2.5 hours. The steady state volume of distribution is approximately 68 L to 72 L. Dexmedetomidine is highly bound to plasma proteins (94%) without significant variations in pharmacokinetic parameter.

Metabolism and Elimination:

Dexmedetomidine undergoes almost complete biotransformation which results in very little amount of drug being excreted in urine and faeces as unchanged form. It is extensively metabolized in the liver through glucuronide conjugation and biotransformation by the cytochrome P450 system without formation of toxic metabolites. The resulting methyl and glucuronide conjugates are excreted by the kidneys. Dexmedetomidine is metabolised by various metabolic pathways. Direct

N-glucuronidation to inactive metabolites accounts for 41% of metabolism of dexmedetomidine. N-methylation to produce 3-hydroxy N-methyl-dexmedetomidine, is the next major pathway accounting for 21% of metabolism of dexmedetomidine.

Hydroxylation followed by conjugation is the other metabolic pathway of dexmedetomidine. It undergoes conjugation (41%), n-methylation (21%), or hydroxylation followed by conjugation. The terminal elimination half life of dexmedetomidine is 2 hours. The average clearance value for dexmedetomidine is approximately 45 L/hr in adults. Renal and hepatic diseases greatly impair the pharmacokinetic properties of dexmedetomidine. Hepatic impairment results in an increase in the volume of distribution and half-life of dexmedetomidine as well as a decrease in clearance and protein binding. Renal dysfunction leads to a decrease in the elimination half-life, however the volume of distribution and clearance are not affected.

Table 1: Pharmacokinetics of Dexmedetomidine

Molecular Weight	236.7 Daltons
Lipid solubility	30
Distribution t1/2	6 min
Protein Binding	94%
Volume of distribution	118 L
Elimination t1/2	120-180 min
Context sensitive half time	4 – 250 min

Mechanism of action :

α_2 receptors are found in both central and peripheral nervous system and also in vital organs like liver, pancreas, kidney. These receptors appear to possess presynaptic, postsynaptic and extrasynaptic sites of action. Among those, presynaptic sites are of clinically significant because they play a vital role in modulating the release of norepinephrine and ATP. Responses to the stimulation of these receptors depend on its location. It is a highly selective α_2 agonist mainly acts on the presynaptic α_2 receptors and results in the suppression of norepinephrine release. Its main action is on the presynaptic α_2 receptors located in the brain and spinal cord inhibiting neuronal firing and thereby leading to hypotension, bradycardia, sedation and analgesia.

Pharmacodynamics:

It exerts a brief biphasic pattern of cardiovascular response after the initial administration. The bolus dose which is usually recommended as 1µg/kg results in initial transient rise of blood pressure associated with reflex bradycardia. This response usually lasts for 5 to 20 min and has been observed in many healthy young individuals. The initial rise in blood pressure which is mainly due to its action in α_2b receptors located in vascular smooth muscles. The transient increase followed by slight decrease in blood pressure occurs mainly because of blockade of central

sympathetic outflow. Dexmedetomidine causes decrease in norepinephrine release causing further hypotension and bradycardia. The incidence of bradycardia in postoperative period is found to be high. So the careful use of the drug is recommended in patients having poor left ventricular function. The sedative action of dexmedetomidine is mediated primarily by its action on post-synaptic $\alpha_2$adrenoreceptors, which in turn exerts its action by inhibiting pertussis-toxin-sensitive G protein, thereby increasing conductance through potassium channels. The sedative effect of dexmedetomidine has been attributed to the action on locus coeruleus located in the brain stem.

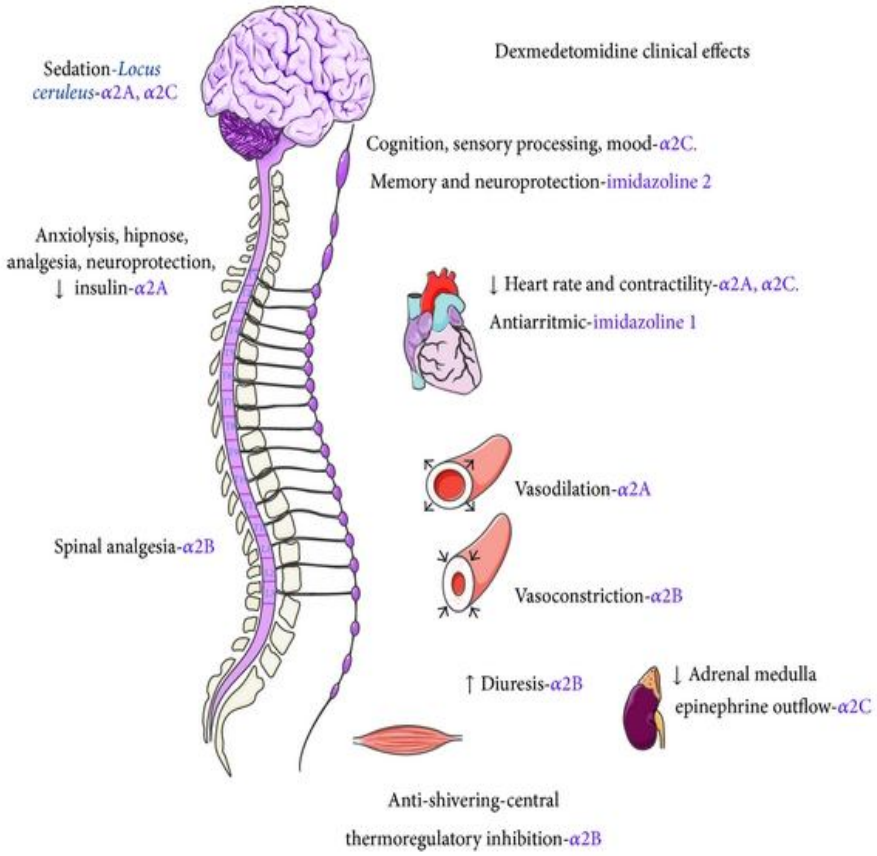

Figure 8: Dexmedetomidine clinical effects

Uses:

1. It is commonly used in ICUs for sedation of intubated patients but should not be used more than 24 hours. Its advantage is patient can be easily arousable and it doesnot produce any respiratory depression like other sedatives.
2. Procedural sedation for surgical procedures without intubation.
3. Reduces the requirement of anaesthetics and opioids during general anaesthesia.
4. Used as an anxiolytic for intravenous regional anaesthesia.
5. It is also used to attenuate the intubation response when given intravenously before performing laryngoscopy.
6. It has got anti shivering property also. The anti-shivering effectsof alpha adrenoceptor agonists are mediated by binding to a2 receptors that mediate vasoconstriction and the anti-shivering effect. In addition, it has hypothalamic thermoregulatory effects. Dexmedetomidine comparably reduces the vasoconstriction and shivering thresholds, thus suggesting that it acts on the central thermoregulatory mechanism rather than peripheral mechanism. Various studies are being conducted to find out the effectiveness of dexmedetomidine in both prevention and treatment of shivering following both general and regional anaesthesia.

7. It is used as an adjunct to spinal anaeshesia and peripheral nerve blocks.

Adverse effects:

1. Hypotension
2. Bradycardia, sinus arrest
3. Transient hypertension
4. Hypoxia
5. Dry mouth ,nausea and vomiting
6. Withdrawal symptoms like head ache, agitation, nervousness when used for more than 24 Hours.
7. Fever, tachycardia,
8. Atrial fibrillation
9. Anaemia

Contraindications:

1. Hypersensitivity to drug
2. Severe ventricular dysfunction
3. Advanced heart blocks
4. patient in shock/hypovolemia

MEPERIDINE [PETHIDINE]

Pethidine is a synthetic opioid analgesic which was first synthesized by the German chemist Otto Eislib. Initially it was used for its potent anticholinergic property later its analgesic properties were recognized. Since then it was widely used for analgesic, antishivering property.

Chemical name:

Ethyl 1-methyl-4-phenylpiperidine-4-carboxylate hydrochloride

Chemical structure:

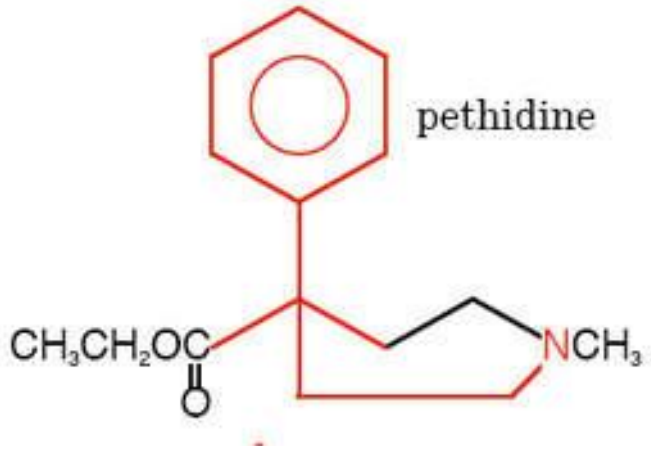

Figure 9: Chemical name and structure of pethidine

Pharmacology:

It is a synthetic opioid analgesic whose effects are similar to morphine. In addition to its analgesic properties its action on CNS causes drowsiness, sedation, euphoria, respiratory depression, dysphoria, nausea, vomiting and EEG changes. It can cause excitation and convulsions when used in large doses. It also has local anaesthetic property but it can cause local irritation when applied.

Mechanism of action:

Pharmacological actions of opioid are generally exerted by its interaction with stereo-specific opioid receptors located in both central and peripheral nervous system

1. It acts at the μ-opioid receptor which is responsible for the analgesic effect.
2. It acts at the κ-opioid receptors which is responsible for the anti shivering effect.
3. It has interactions with sodium ion channel which is responsible for the local anaesthetic property.
4. Its structure is similar to atropine and tropane alkaloids and so has their effects and side effects.
5. It inhibits the dopamine transporter and norepinephrine transporter by which it has stimulant effects.
6. It has certain interactions with serotonergic neurons.

Onset of action is faster due to higher lipid solubility. Its clinical effect lasts for 120-150 minutes. It can cause physical dependence or addiction like other opioids. It is associated with more euphoria, confusion, cognitive and impaired psychomotor performance. The side effects of pethidine are primarily due to action of its metabolite norpethidine.

Pharmacokinetics

Absorption:

Pethidine is administered as intramuscular, intravenous or subcutaneous injection. When given as intramuscular injection the absorption is variable. Analgesia effect usually lasts for two to four hours following intravenous, intramuscular, and subcutaneous administration.

Distribution:

Pethidine is extensively distributed extravascularly mainly into rapidly perfused tissues. Volume of distribution is 4.17 l/kg. Plasma protein binding is 64.3%.

Metabolism:

Pethidine is extensively metabolized in the liver. Metabolised mainly by hydrolysis and n- demethylation. Hydrolysis takes place in the liver and it is converted to pethidinic acid. n-demethylation converts it into norpethidine. Norpethidine has half the analgesic property but has a longer elimination half-life. It gets accumulated in renal failure. It is neurotoxic and posses convulsant and hallucinogenic properties due to its

anticholinergic property which cannot be antagonised with opioid antagonists. It is conjugated with glucuronic acid and excreted in urine . It is advisable to administer pethidine with cautious dose adjustments when used in patients with hepatic dysfunction in order to avoid its accumulation.

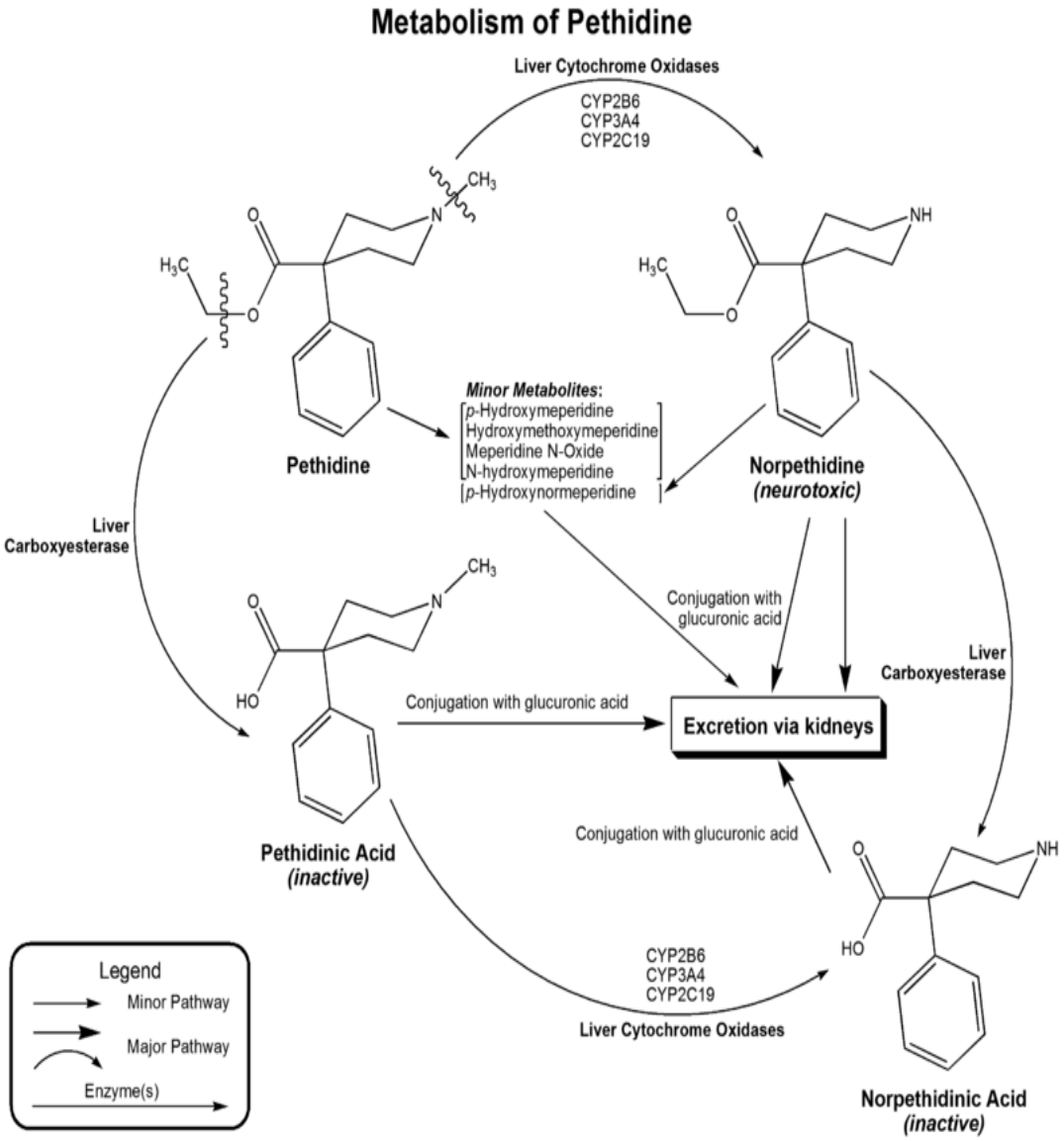

Figure 10: Metabolism of pethidine

Excretion:

Mean plasma clearance after an i.v injection is 1.06 L/min. Elimination half-life of pethidine is approximately 3.5 hours but in case of patients with liver cirrhosis and acute viral hepatitis elimination half life can be increased upto 7-11hrs. In renal dysfunction patients, the elimination half-life of norpethidine is prolonged to 30 hours. In pregnant women, the half-life of norpethidine is approximately 20.6 hrs. Acidification of urine enhances urinary excretion of pethidine and norpethidine.

Indications:

1. Short term relief of moderate to severe pain via I.M , S.C, I.V bolus, PCA, I.V infusion.
2. As an anaesthetic adjunct and in obstetric analgesia.
3. Drug of choice for treatment of shivering in patients undergoing surgeries under regional and general anaesthesia. Pethidine acts via opioid receptors, mainly κ receptor. It decreases the shivering threshold twice as much as vasoconstriction threshold. The special anti shivering property of pethidine is because of the disproportionate decrease in the threshold of shivering. Pethidine also acts via κ receptors and decreases shivering. Pethidine is considered the gold standard in abolishing shivering in patients under anaesthesia. So, numerous studies have been conducted

comparing pethidine with other drugs in the prevention and treatment of shivering. It is administered at a dose of 0.5mg/kg for the treatment of shivering.

Adult Dosage:

1. **Analgesia**

   IM / S.C. injection -25 to 100 mg every 3 to 4 hours.

   IV injection- 25 to 50 mg every 3 to 4 hours.

   Usual recommended dose is about 200 mg/day by the IV route.

2. **Patient-Controlled Analgesia**

   For adults, demand doses of 5 mg to a maximum of 20 mg pethidine have been given via PCA using a lock out interval of about 6 to 20 minutes.

Contraindications:

1. Hypersensitivity
2. Respiratory depression.
3. Conditions associated with poor respiratory reserve like, acute bronchial asthma, severe chronic bronchitis, severe emphysema, kyphoscoliosis.
4. Head injury, raised ICP, space occupying lesions.
5. Cardiac arrythmias, especially Supraventricular tachycardias, cor pulmonale.

6. Convulsive states such as status epilepticus, tetanus and strychnine poisoning.
7. Pre-eclampsia, eclampsia.
8. DKA
9. Liver disease
10. Patients with coagulation disorders.

Drug interactions:

1. Enhances CNS depressant effects of barbiturates, butyrophenones, chloral hydrate, benzodiazepines.
2. Phenobarbitone reduces its analgesic effect.
3. With phenothiazines it causes CNS toxicity and hypotension including respiratory depression.
4. With butyrophenones increased CNS depressant effect can occur.
5. With monoamine oxidase inhibitors excitation, sweating, rigidity, hypertension, delirium, coma can occur.
6. Paracetamol absorption may be decreased because of delayed gastric emptying.
7. Effects of derivative anticoagulants may be increased.

Common Adverse reactions:

In general, dry mouth, weakness, hypersensitivity usually occurs. CNS symptoms include sedation, dizziness, lightheadedness, sweating,

disorientation, hallucinations and psychosis. Gastrointestinal symptoms include nausea, vomiting and constipation.

Other adverse reactions:

Accidental intra-arterial administration can cause vasodilation, hypotension, hypertension, tachycardia, bradycardia and gangrene. Dermatological reactions like rash, pruritus, urticaria, erythema, irritation and induration, repeated intramuscular injections can cause fibrosis. Decreased gastric emptying, increased biliary tract pressure, choledochoduodenal sphincter spasm, urinary retention visual and auditory hallucinations, agitation, irritability, mania, paranoia, delirium and complex partial seizures, vertigo, dizziness, coma, headache, convulsions or tremor, respiratory depression, cold clammy skin, sweating and pallor.

Camus and colleagues[23] studied the effect of delivering warmed intra-venous fluids in order to prevent intra-operative hypothermia. They randomly divided 18 patients undergoing prolonged abdominal surgery into two groups of 9 patients each depending on the intra-operative fluid management they received. 9 patients received intravenous fluids at room temperature while another 9 received warmed intravenous fluids. All 18 patients were covered with warming blanket at the exposed skin surface. They estimated 217 kilojoules decrease in heat loss provided by using warmed intravenous fluids. During recovery, only 1 patient who received

warmed intravenous fluid shivered while 7 patients who received intravenous fluids at room temperature shivered. Thus they noted that infusion of warmed intra-venous fluids in combination with blankets to cover exposed skin surface in intra-operative period helps to prevent intra-operative hypothermia and also reduces incidence of post-operative shivering.

Dyer and Heathcote et al[24] conducted a prospective study in 100 patients to reduce heat loss during trans-urethral resection of prostate under spinal anaesthesia by using blankets and used heated 1.5% glycine as bladder irrigation solution. They noted that there was marked decrease in incidence of shivering when the patients received both blanket cover and heated 1.5% glycine bladder irrigation solution.

Buggy and Crossley et al[25] reviewed thermoregulation, mild peri-operative hypothermia and post- anaesthetic shivering. They observed that shivering occurred in 33% of patients who underwent procedures under epidural anaesthesia. They concluded that shivering occurs due to impairment of physiologic set points, and combined general-epidural anaesthesia has particularly higher risk to cause core hypothermia.

Doufas et al[26] studied the consequences of inadvertent peri-operative hypothermia. He noted that peri-operative hypothermia increases the incidence of adverse myocardial outcome in high-risk patients and also causes increased incidence of blood loss and wound infection of the

surgical site in patients who underwent colon surgery, thereby increasing duration of hospital stay upto 20%. Hypothermia also affects the body immune mechanisms and metabolism of drugs in the body.

Saito and co-workers[27] studied the thermoregulatory effects of spinal and epidural anaesthesia during cesarean section delivery. They tested a hypothesis that onset of hypothermia was faster under spinal anaesthesia as compared to epidural anaesthesia. They randomly assigned patients undergoing cesarean delivery under spinal anaesthesia with 2 milliliters of 0.5% Dibucaine or epidural anaesthesia with 20 milliliters 2% mepivacaine. Tympanic membrane temperature was measured. They failed to confirm the hypothesis but concluded that thermoregulation was more impaired with spinal anaesthesia than with epidural.

Usta B et al[28] conducted the study to evaluate the effect of dexmedetomidine on shivering in patients undergoing minor surgical procedures under spinal anaesthesia with hyperbaric bupivacaine. In that 60 patients[ASA 1 and 2, aged 18-50yrs] were equally divided into two groups C and D. In that group D received dexmedetomidine and the group C received normal saline as placebo. The presence of shivering was assessed by a blinded observer after the completion of spinal anesthetic injection. In that 3 patients in group D developed shivering whereas in group C, 17 patients experienced shivering. The intensity of shivering was lesser in patients who received dexmedetomidine when compared to

normal saline group C. He concluded that dexmedetomidine infusion in the perioperative period significantly reduced the incidence of shivering in patients undergoing minor procedures under spinal anaesthesia without any significant adverse effects during perioperative period.

Kelsaka E et al[29] conducted a double blinded study to compare the effectivenss of ondansetron and meperidine for prevention of shivering in patients undergoing spinal anesthesia. In this study, 75 patients were randomised into 3 groups. Group O received ondansetron 8mg and Group M received meperidine 0.4mg/kg intravenously just before giving spinal anesthesia respectively. whereas Group C received normal saline. The incidence of shivering and core temperature was recorded in all the three groups. Association between the maximum block height and mean rectal temperatures of the patients were evaluated. From the data obtained the core temperature was preserved in both the groups who received ondansetron and meperidine when compared to control group. Shivering was observed in 8% of patients in Group O and M and 36% in Group C. The correlation between maximum block height and mean rectal temperatures was lost in both the ondansetron and meperidine groups. It was concluded that meperidine and ondansetron were equally effective in controlling the shivering .

Asif Iqbal and co[30] conducted a study in which 90 patients belong to the age group 20-60yrs, with ASA physical status I and II,

planned for laparoscopic surgery under general anaesthesia were randomly allocated in to three groups in which Group P, [n=30] was given pethidine 25mg Group G, [n=30] received granisetron 40µg/kg and Group S normal saline as a control group just before induction. Temperature probe was kept in the nasopharynx and measured throughout the procedure. An investigator, blinded to the treatment group, graded postoperative shivering .Prophylaxis was considered as ineffective if the shivering grade was greater than 3. Those cases who had shivering grades more than 3 received intravenous pethidine 25 mg was as rescue medication. The three groups did not differ significantly regarding patient characteristics. The incidence of shivering in patients who arrived in the recovery room 15 minutes after the surgery were significantly less in Group P (7%) and Group G(17%) who received pethidine and granisetron respectively than in Group S (60%). The P values of group P and G differ significantly than in Group S ($p<0.05$). However, the difference between Groups P and G was not statistically significant ($p>0.05$). So it was concluded that prophylactic use of pethidine(25mg) and granisetron (40mcg.kg-1) is effective in preventing postopearative shivering .

Kimya et al [31] compared the efficacy of nefopam with meperidine for prevention of shivering during spinal anaesthesia. sixty five patients, aged 20-65, with American Society of Anesthesiologists physical Status I or II who were scheduled for elective orthopaedic surgery under spinal

anesthesia were randomly allocated into two groups in which group M [n=33] received meperidine 0.4mg/kg body weight and Group N, [n = 32] received nefopam 0.15 mg/kg as intravenous infusion in 100 ml of isotonic saline. All drugs were infused over 15 min before giving spinal anesthesia by a blinded investigator After giving spinal anaesthesia, the parameters like heart rate, blood pressure, temperature, Spo2 were monitored intraoperatively at 15, 30, and 60 minutes . It was observed that the incidence and grades of shivering were similar in both the groups so it was concluded that nefopam which is a non opioid analgesic can be used as a alternate for meperidine in the prevention of shivering under spinal anaesthesia.

Mohammad Maroof et al[32] conducted a placebo-controlled double-blind study to assess the effect of epidurally administered preservative-free dexmedetomidine on postoperative shivering following epidural anesthesia. 60 ASA I & II adult male patients, aged between 20-40 years; weight range 50-70 kg undergoing elective orthopedic surgical procedures of the lower limb were selected. The selected patients were randomly divided into group A (Dex) and group B (control) 30 patients each. Group A received 20 ml of 0.5% bupivacaine (plain) + DEX 1 ml [2mcgkg-1]. Group B received 20 ml of 0.5% Bupivacaine [plain] + 1 ml normal saline. Routine monitors were applied intra operatively. There was a significantly lower incidence of shivering in

group A as compared to group B (10% and 36.6% respectively). There was no significant difference in the mean arterial pressure (MAP) recorded for 6 postoperative hours in either group. Although there was a significant decrease in the heart rate (HR) during the first 3 post operative hours in groups A, the HR in group B was not significantly changed during the first 6 hours post operatively. There was no significant difference in the respiratory rate or level of sedation in either group, compared to each other and to their pre operative value. Conclusion of the study found that epidural administration of dexmedetomidine significantly decreases shivering following epidural anesthesia.

Bicer C et al[33] conducted a study to evaluate the efficacy of dexmedetomidine in preventing postanaesthetic shivering by comparing with meperidine and placebo group. About 120 patients (ASA I–II) scheduled for elective lower abdominal or orthopaedic surgery of about 1–3 h duration were allocated in to 3 groups. Forty patients in each group randomly received 1 μg/kg of dexmedetomidine, 0.5 mg/kg of meperidine or saline 0.9% as placebo, intravenously (i.v.). Parameters like mean arterial pressure, HR, SpO2 and central body temperature were measured throughout the procedure. Among the 3 groups, postanaesthetic shivering was seen in 22 patients in the placebo group, six patients in the dexmedetomidine group and four patients in the meperidine group. Conclusion of the study was intraoperative intravenous

administration of dexmedetomidine 1μg/kg reduces incidence of postanaesthetic shivering as does meperidine 0.5 mg/kg in patients after major surgery.

Sukhminderjit Jit Singh Bajwa et al[34] conducted study on 80 patients, aged 22–59 years, belongs to ASA physical status I and II, who underwent laparoscopic surgical procedures under general anaesthesia by using dexmedetomidine infusion in order to find out its effectiveness in controlling shivering. Patients were allocated randomly into two groups: group N (n = 40) and group D (n = 40). Group D were administered 1 μg/kg of Dexmedetomidine intravenously, while group N received saline during peri-op period. Cardiorespiratory parameters like HR, blood pressure, SpO2 were monitored continuosly and recorded during the preop, intraop, and postop periods. During the postoperative period patients were observed for shivering and recorded as per shivering grading scale. Side effects like hypotension, bradycardia were observed, recorded, and treated symptomatically. Incidence of shivering in group D who received dexmedetomidine intravenously were significantly reduced when compared to group N who received normal saline. Around 42.5% of patient in group N developed shivering, which was statistically highly significant (P = 0.014). Heart rate and mean arterial pressure also showed significant variation clinically and statistically in group D patients during the postop period (P 0.008 and 0.012). A high incidence of sedation (P =

0.000) and dry mouth (P = 0.000) was observed in group D, whereas the incidence of nausea and vomiting was higher in group (P = 0.011 and 0.034). Conclusion was dexmedetomidine seems to possess antishivering properties and was found to reduce the occurrence of shivering in patients undergoing general anesthesia.

Bozgeyik et al[35] conducted a study in which total of 90 patients aged 18-60years with American Society of Anesthesiologists physical status I-II, undergoing elective arthroscopic surgery under spinal anaesthesia were divided into three groups randomly. After spinal block, 100 mg tramadol in 100 ml saline was applied in group T (n = 30) and 0.5 μg/kg dexmedetomidine in 100 ml saline was applied in group D (n = 30) and 100 ml saline was administered in group P- (n = 30) in 10 min. The hemodynamics, oxygen saturation, tympanic temperature, shivering and sedation scores were evaluated and recorded intraoperatively and 45 min after a postoperative period. Results: In group T and D, shivering scores were significantly lower when compared with group P in the intraoperative 20th min (P = 0.01). Sedation scores in group D were significantly higher than the baseline values (P = 0.03) and values in group T and P (P = 0.04). Conclusion of the study was preemptive tramadol and dexmedetomidine are effective in preventing the shivering under SA. In addition, dexmedetomidine was superior in increasing the

level of sedation which is sufficient to prevent the anxiety without any adverse effects.

Geetha mittal and co[36] did a study in 60 patients of ASA physical status 1 and 2 in which Both dexmedetomidine (0.5 μg/kg) and tramadol (0.5 mg/kg) are effective in treating patients with post-spinal anaesthesia shivering, but time taken for complete cessation of shivering was shorter with dexmedetomidine as compared to tramadol, the difference being statistically significant. Furthermore, dexmedetomidine causes fewer adverse effects like nausea and vomiting. Sedation caused by dexmedetomidine provides additional comfort to the patient.

Semra Karaman[37] and co conducted a placebo-controlled, randomized study to evaluate the efficacy of dexmedetomidine in preventing postoperative shivering. In that Sixty patients who underwent gynecologic laparoscopic surgery were assigned randomly to 2 groups and administered dexmedetomidine as a loading of 1 μg kg–1 for 10 min followed by maintenance infusion of 0.5 μg kg/hr in 1 group and normal saline infusion in another group. Postoperative shivering was observed in 14 patients in normal saline group when compared to only 3 patients who received dexmedetomidine. The sedation scores were on the higher side in the dexmedetomidine group than in the saline group which made the patient comfortable during surgical procedure

Mohamed Hamdy Ellakany[38] et al conducted a study in 75 patients who underwent lower abdominal surgeries under spinal anaesthesia. Intrathecal dexmedetomidine and meperidine lowered the incidence of shivering and increased duration of sensory and motor block during lower abdominal operations. Intrathecal meperidine caused more pruritus, nausea and vomiting than intrathecal dexmedetomidine.

Hazem el syed and co[39] conducted a randomized control study in which 80 patients who were scheduled for elective TURP under spinal anaesthesia were randomly allocated into two groups in which one group received 0.5 ml of normal saline along with 2.5 ml of 0.5 percent bupivacaine and the another group received 10 µg of dexmedetomidine along with 2.5 ml of 0.5% bupivacaine and found that incidence of shivering was significantly reduced in the dexmedetomidine group when compared with normal saline group with occurrence of tolerable side effects like hypotension and bradycardia.

Blain Easley et al [40] conducted a study in which twenty-four children aged 7 to 16 years who underwent surgical procedures under general anaesthesia along with regional technique were allocated into the study. Those children who fulfilled the inclusion criteria (i) shivering, (ii) successful extubation, and (iii) no other complaint/indication of pain were given a single intravenous bolus dose of dexmedetomidine (0.5 µg/kg) over 3-5 min and observed. Following the completion of drug administration,

shivering activity was recorded every minute (up to 10 min) with any adverse effects or complaints were treated accordingly. All children who received dexmedetomidine had a cessation of shivering behavior within 5 min at the end of dexmedetomidine administration. No significant adverse effects and shivering recurrence were observed.

MATERIALS AND METHODS

Ethics Committee Approval

The Institutional Ethics committee reviewed the application and granted ethical approval for the study.

Study Design

A Single centre, cross-sectional and comparative study design was used.

Study Sample: 80

Study Setting

Government Kilpauk Medical College

Period of Study

The work was carried out from March, 2015 to July, 2015.

Inclusion Criteria

1. Patients undergoing elective lower abdominal surgeries under spinal anesthesia.
2. Patients between the age group of 18 to 60yrs
3. American Society of Anesthesiologists physical status I or II

Exclusion criteria:

1. Patients not willing for the study
2. ASA III & ASA IV
3. Pregnant women
4. Patients who are known allergic to study drugs

5. Contraindications to spinal anaesthesia
6. Duration of surgery more than 2 hours
7. Patients with thyroid disease, Addisons disease, Parkinsons disease, Raynauds syndrome, cardiopulmonary, liver and renal diseases. History of convulsions/epilepsy, bronchial asthma, patient with enlarged prostate or urinary retention problems.
8. Any need for blood transfusion during intraoperative period
9. Initial body temperature <36.0 or >37.5 .c
10. Use of sedative hypnotic agents, antidepressant therapy like monoamine oxidase inhibitors, selective serotonin reuptake inhibitors, vasodilators, benzodiazepines.

Consent

An informed consent was obtained from participants after explaining the study procedure to them.

Materials:

The following equipments, drugs and monitors were kept ready for the conduct of anaesthesia

Drugs:

1. Inj.Dexmedetomidine 0.5µg/kg
2. Inj.Meperidine 0.5mg/kg
3. Inj.Ondansetron 8mg
4. 3.5 ml of 0.5% hyperbaric bupivacaine

5. 2ml of 2% lignocaine for local infiltration

Monitors:

A multi parameter monitor with following was made available

1. Electrocardiography
2. Non-invasive Blood Pressure
3. Pulse Oximetry
4. Thermometer to measure axillary temperature

Methods:

Screening of patients

Before data collection began, informed written consent was obtained from all patients after explaining the procedure. All patients were interviewed during their first visit of the study and their medical history was obtained using a proforma. Details of the history included.

Method of collection of data

Eighty patients, aged (18-60years), assessed under ASA physical status I or II scheduled for elective lower abdominal surgical surgeries under spinal anesthesia will be enrolled in the study.

The patients were seen preoperatively day before surgery. Patient was adviced nil per oral for 8 hours duration and antacid prophylaxis were given before shifting the patient to theatre. The operating room temperature will be maintained at 23°C to 25°C (measured by a wall thermometer).

The anaesthesia machine was checked before shifting the patients, all the airway gadgets like laryngoscope, endotracheal tube, oral airway and suction were kept ready. Emergency drugs like adrenaline, atropine, ephedrine were kept ready. Irrigation and I.V fluids administered to the patients were kept at room temperature and given without inline warming. All patients will be covered with one layer of surgical drapes over the chest, thighs, and calves during the operation. No other warming device will be used. A core temperature below 36°C will be considered hypothermia.

Patients were shifted to the operation theatre, monitors were connected (pulse oximetry, electrocardiography, temperature and non-invasive arterial blood pressure monitoring), intravenous (IV) access was secured with 18-G cannula and patients were preloaded with RL at 10ml/kg over 15 mins before performing spinal anesthesia. Under strict aseptic precaution, patient in right lateral position subarachnoid block will be instituted at L3-4 interspaces by using a 25G Quincke spinal needle and 3.5 ml of hyperbaric bupivacaine will be injected . The patients will be randomly allotted to one of two groups using a computer-generated random list. Group D will receive dexmedetomidine (n=40) and Group M will receive meperidine (n=40). Just after giving intrathecal injection, all drugs will be infused intravenously. Group D will be given an I.V bolus of dexmedetomidine 0.5 mcg per kg in 100ml

normal saline over a period of 10 minutes. Group M will receive 0.5mg per kg meperidine in 100 ml normal saline intravenously. All the patients will receive Supplemental oxygen via face mask during surgery. Patients were monitored throughout the procedure and post operatively for 24 hours.

Motor block is assessed by using a Modified Bromage scale

Grade 0 - no motor block;

Grade 1 - Inability to raise extended leg, able to move knees and feet

Grade 2 - inability to raise extended leg and move knees, able to move feet

Grade 3 - Complete block of motor limb

Sensory block is assessed by the pinprick test.

Shivering is graded on a scale similar to that validated by Tsai and Chu

0 = No shivering

1 = Piloerection or peripheral vasoconstriction without visible shivering

2 = Muscular activity involving only one muscle group,

3 = Muscular activity involving more than one muscle group but not generalized

4 = Shivering involving the whole body.

Sedation score will be assessed by using Ramsay sedation scale

1 - Patient is anxious and agitated or restless

2 - Patient is cooperative, oriented and tranquil

3 - Patient responds to commands only,

4 - Patient exhibits brisk response to light glabellar tap or loud auditory stimulus

5 - Patient exhibits sluggish response to light glabellar tap or loud auditory stimulus

6 - Patient exhibits no response

Patient's heart rate, blood pressure, oxygen saturation and temperature will be recorded at every 5 minutes till end of surgery. The incidence and severity of shivering will be recorded at every 5min during the surgery. If the patient's heart rate falls below 50 bpm, 0.6 mg of atropine was administered intravenously. Hypotension is defined as a decrease in the mean arterial pressure (MAP) of more than 20 % from baseline. Hypotension is treated with 6 mg Ephedrine via I.V bolus and then with further I.V infusion of lactated Ringer's solution as required. If patients develop nausea and vomiting, inj.ondansentron 8mg IV was administered. Patients who developed shivering during the study period were given Inj. dexmedetomidine 0.3mics/kg IV over 5 min as a rescue drug.

Statistical Analysis

The patients were divided into two groups by meperidine and dexmedetomidine groups. Descriptive statistics was done for all data and were reported in terms of mean values and percentages. Suitable statistical tests of comparison were done. Continuous variables were analysed with the unpaired t test. Categorical variables were analysed with Fisher Exact Test. Statistical significance was taken as $P < 0.05$. The data was analysed using SPSS version 16 and Microsoft Excel 2007.

RESULTS

80 patients included in the study (40 each in dexmedetomidine and meperidine group)

AGE

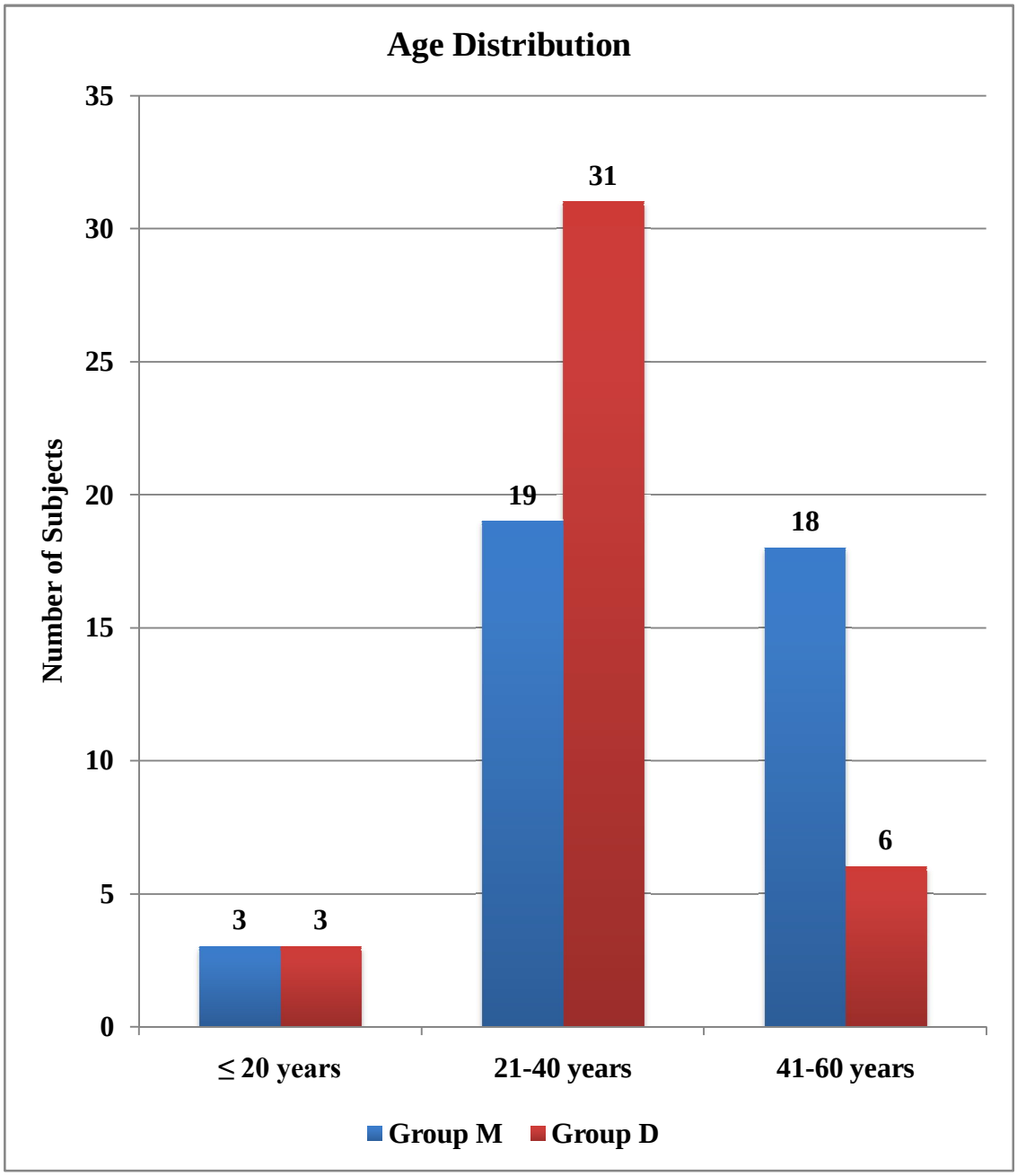

Figure 11

Table 2 :

Age Distribution	Group M	%	Group D	%
≤ 20 years	3	7.50	3	7.50
21-40 years	19	47.50	31	77.50
41-60 years	18	45.00	6	15.00
> 60 Years	0	0.00	0	0.00
Total	40	100	40	100

Table 3 :

Age Distribution	Group M	Group D
N	40	40
Mean	38.28	33.28
SD	10.63	9.50
P value Unpaired t Test		0.2951

Majority of the meperidine group patients belonged to the 21-40 years age group (n=19, 47.50%) with a mean age of 38.28years. In the dexmedetomidine group patients, majority belonged to the same age group as meperidine group (n=31, 77.50%) with a mean age of 33.28 years. The association between the intervention groups and age distribution is considered to be not statistically significant since $p > 0.05$ as per unpaired t test.

GENDER

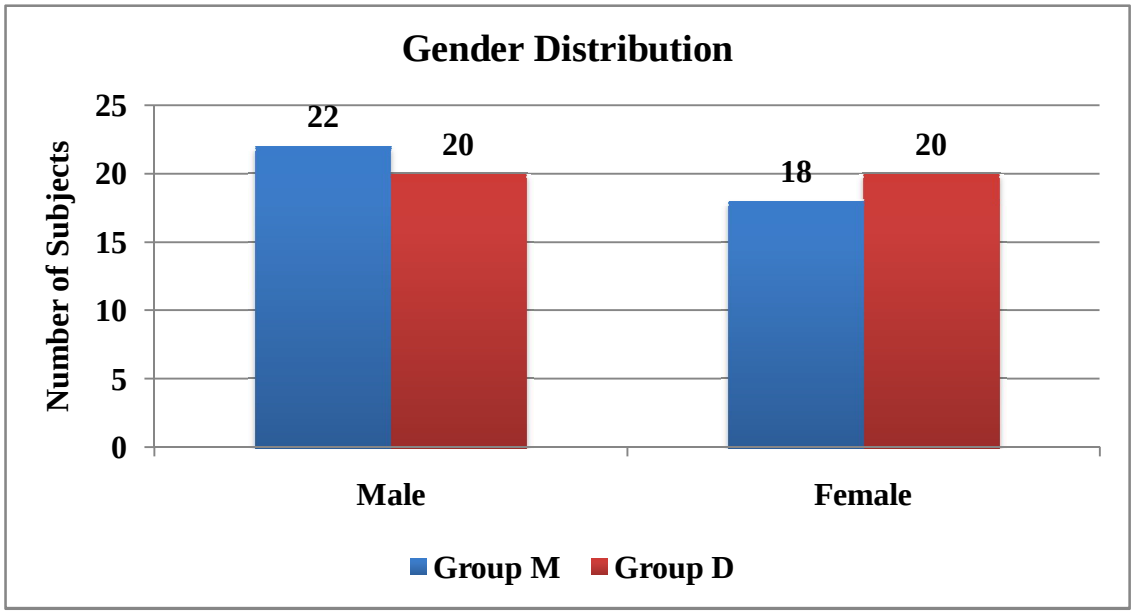

Figure 12 :

Table 4 :

Gender Distribution	Group M	%	Group D	%
Male	22	55.00	20	50.00
Female	18	45.00	20	50.00
Total	40	100	40	100
P value Fishers Exact Test			0.6626	

Majority of the meperidine group patients belonged to the male gender group (n=22, 45%). In the dexmedetomidine group patients, majority belonged to the male gender group (n=20, 50%). The association between the intervention groups and gender distribution is considered to be not statistically significant since $p > 0.05$ as per fishers exact test.

WEIGHT

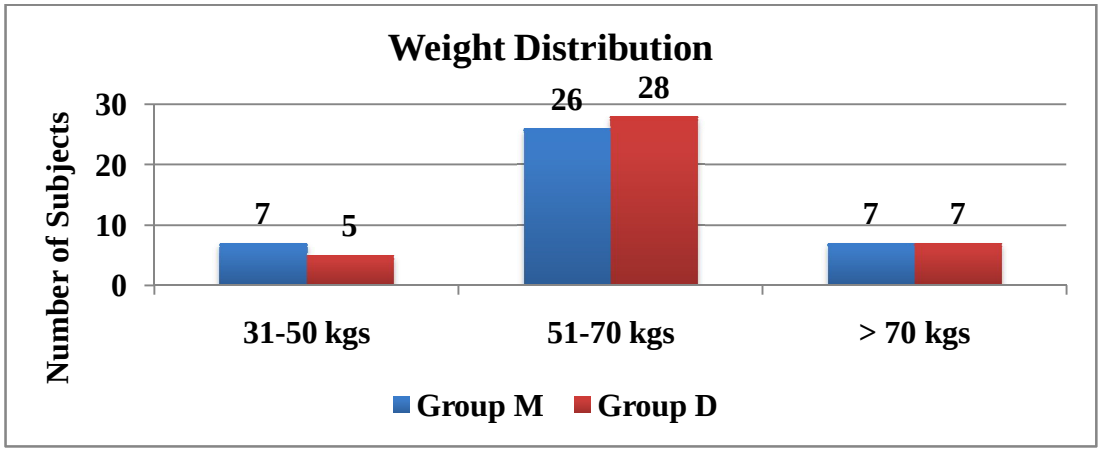

Figure 13 :

Table 5 :

Weight Distribution	Group M	%	Group D	%
31-50 kg	7	17.50	5	12.50
51-70 kg	26	65.00	28	70.00
> 70 kg	7	17.50	7	17.50
Total	40	100	40	100

Table 6 :

Weight Distribution	Group M	Group D
N	40	40
Mean	59.38	61.25
SD	10.73	9.90
P value Unpaired t Test		0.4192

Majority of the meperidine group patients belonged to the 51.00 kg weight group (n=26, 65%) with a mean weight of 59.38 kg. In the dexmedetomidine group patients, majority belonged to the same weight group as meperidine group (n=28, 70%) with a mean weight of 61.25 kg. The association between the intervention groups and weight distribution is considered to be not statistically significant since $p > 0.05$ as per unpaired t test.

HEIGHT

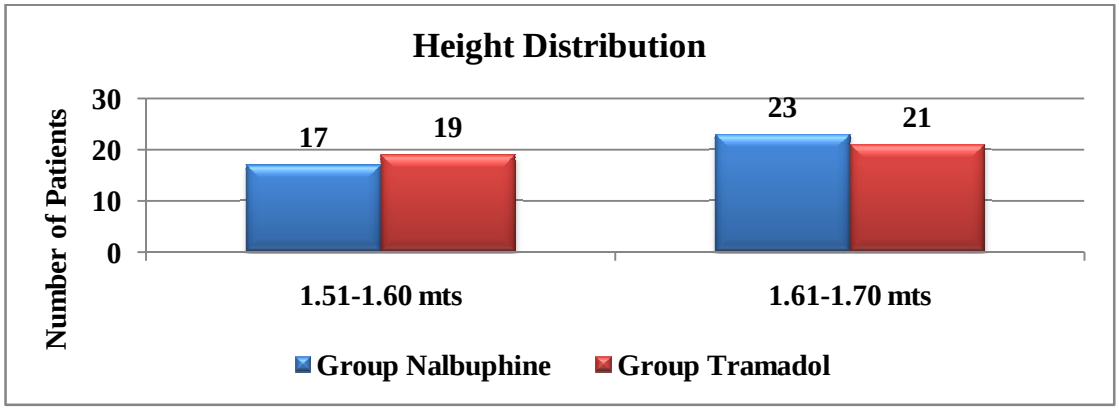

Figure 14 :

Table 7:

Height Distribution	Group M	%	Group D	%
1.51-1.60 mts	17	42.50	19	47.50
1.61-1.70 mts	23	57.50	21	52.50
Total	40	100	40	100

Table 8:

Height Distribution	Group M	Group D
N	40	40
Mean	1.61	1.62
SD	0.07	0.08
P value Unpaired t Test		0.6314

Majority of the meperidine group patients belonged to 1.61to1.70 meters height group (n=23, 57.50%) with a mean height of 1.61 meters. In the dexmedetomidine group patients, majority belonged to the same height group as meperidine group (n=21, 52.50%) with a mean height of 1.62 meters. The association between the intervention groups and height distribution is considered to be not statistically significant since $p > 0.05$ as per unpaired t test.

ASA CLASSIFICATION

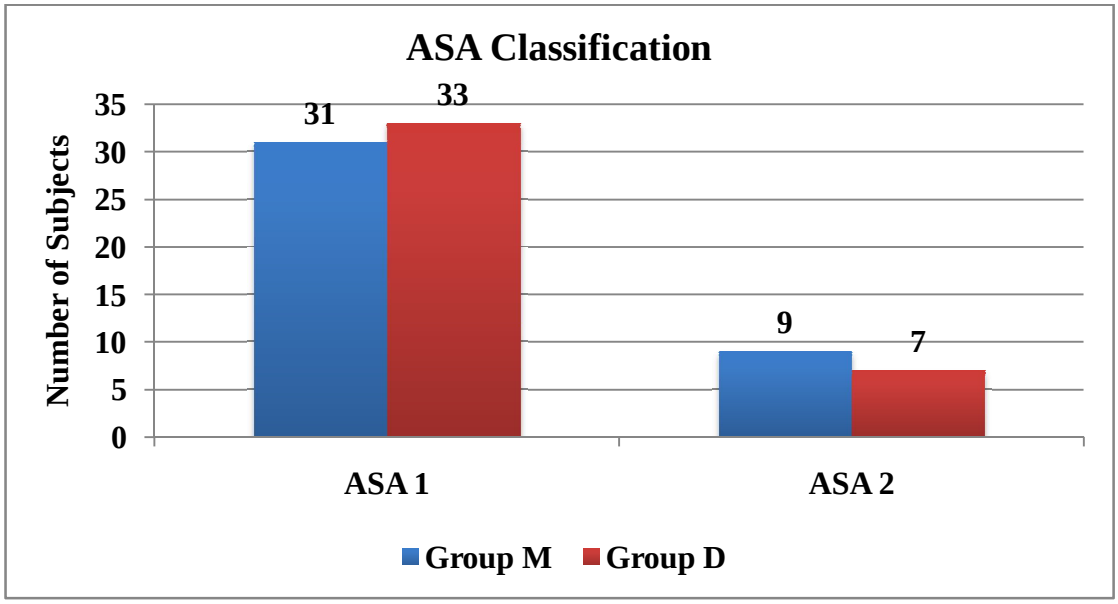

Figure 15 :

Table 9 :

ASA Classification	Group M	%	Group D	%
ASA 1	31	77.50	33	82.50
ASA 2	9	22.50	7	17.50
Total	40	100	40	100
P value Fishers Exact Test			0.5915	

Majority of the meperidine group patients belonged to the ASA 1 group (n=31, 77.50%). In the dexmedetomidine group patients, majority belonged to the ASA 1 group (n=33, 82.50%). The association between the intervention groups and ASA classification is considered to be not statistically significant since $p > 0.05$ as per Fisher exact test.

HEART RATE

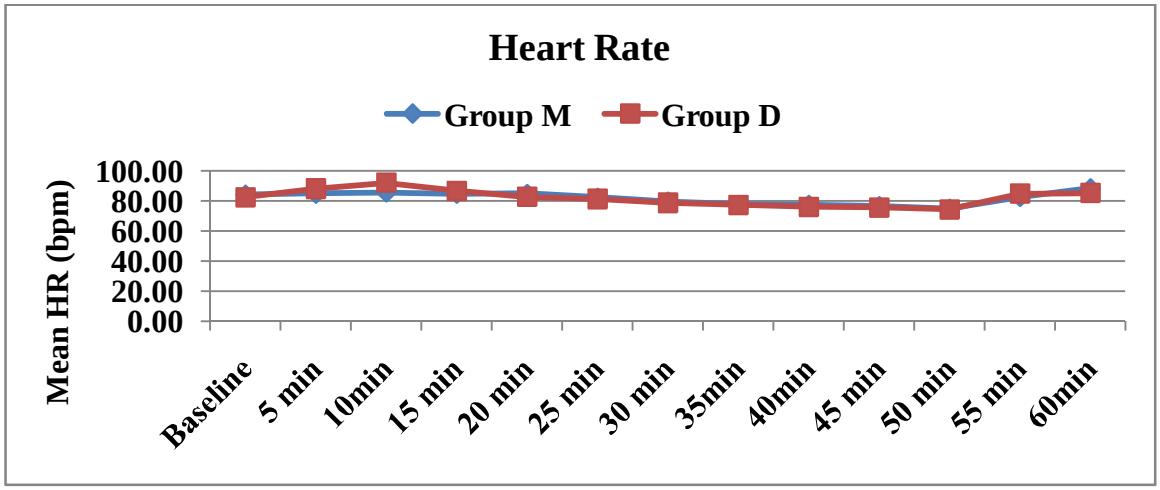

Figure 16 :

Table 10 :

Heart Rate		Baseline	5 min	10min	15 min	20 min	25 min	30 min
Group M	N	40	40	40	40	40	40	40
	Mean	84.28	84.95	85.63	84.85	84.95	82.38	79.65
	SD	6.71	8.92	9.92	10.85	11.21	10.98	10.34
Group D	N	40	40	40	40	40	40	40
	Mean	82.63	88.23	92.23	86.85	82.80	81.43	78.85
	SD	5.66	8.49	8.48	12.40	12.85	10.35	8.92
P value Unpaired t Test		0.2381	0.0965	0.1120	0.4450	0.4276	0.6916	0.7121

Table 11 :

Heart Rate		35min	40min	45 min	50 min	55 min	60min
Group M	N	40	40	40	40	40	40
	Mean	77.73	77.60	76.65	74.88	82.63	88.58
	SD	8.92	8.21	6.92	7.20	5.66	8.68
Group D	N	40	40	40	40	40	40
	Mean	77.33	75.98	75.70	74.45	84.95	85.33
	SD	7.92	6.91	6.51	6.41	8.92	10.74
P value Unpaired t Test		0.8326	0.3413	0.5289	0.7811	0.1685	0.1408

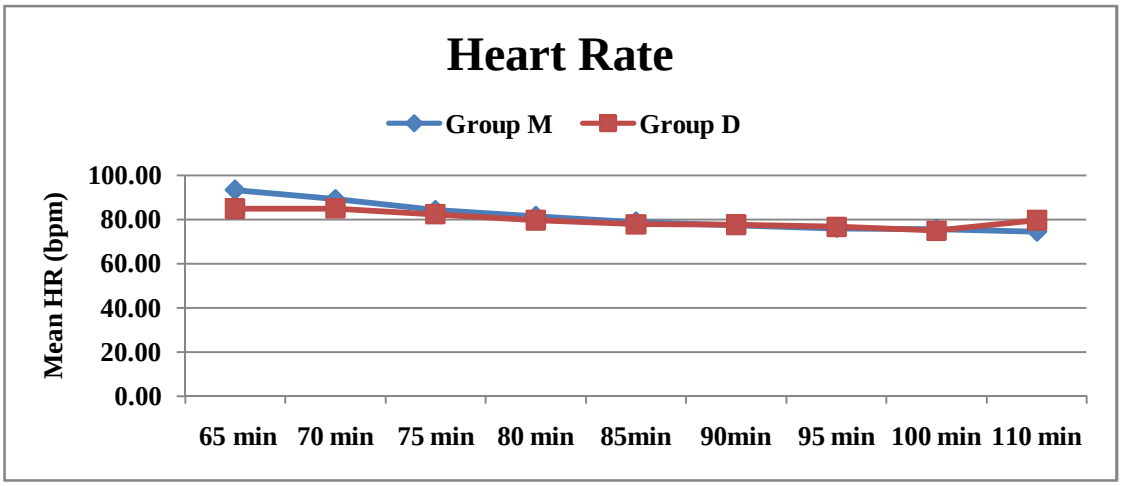

Figure 17 :

Table 12 :

Heart Rate		65 min	70 min	75 min	80 min	85 min	90 min	95 min	100 min	110 min
Group M	N	40	40	40	40	40	40	40	40	40
	Mean	93.38	89.25	84.28	81.43	78.85	77.33	75.98	75.70	74.45
	SD	8.83	8.31	10.22	9.02	8.92	7.92	6.91	6.51	6.41
Group D	N	40	40	40	40	40	40	40	40	40
	Mean	84.85	84.95	82.38	79.65	77.73	77.60	76.65	74.88	74.00
	SD	10.85	11.21	10.98	10.34	8.92	8.21	6.92	7.20	10.34
P value Unpaired t Test		0.3322	0.2452	0.4255	0.4159	0.5742	0.8793	0.6637	0.5922	0.1488

Majority of the meperidine group patients had mean heart rate ranging from 84.28 to 74.45 between baseline and 110 minutes intraoperatively. Similarly majority of the dexmedetomidine Group patients had mean heart rate ranging from 82.63 and 74.00 between baseline and 110 minutes intraoperatively. The association between the intervention groups and mean heart rate is considered to be not statistically significant since $p > 0.05$ as per 2 tail unpaired t test.

MEAN ARTERIAL PRESSURE

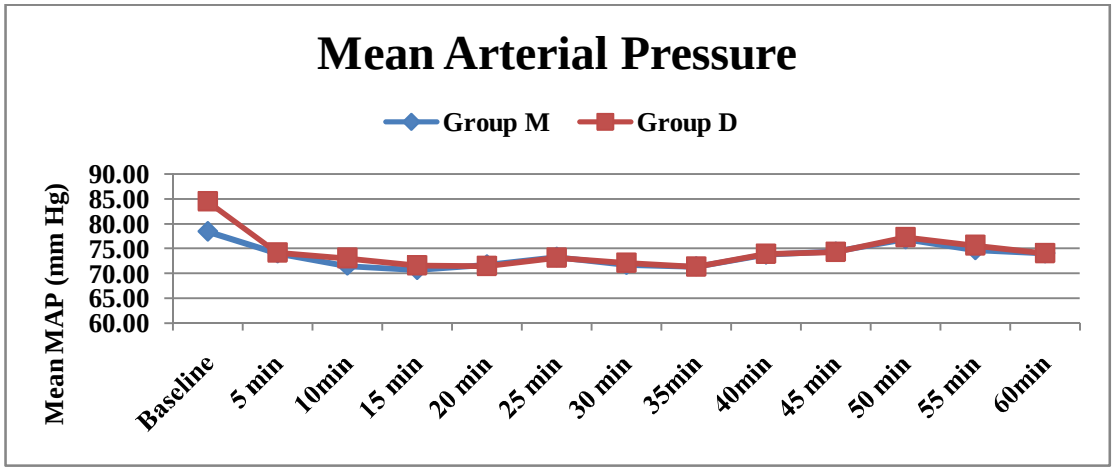

Figure : 18

Table 13 :

Mean Arterial Pressure		**Baseline**	**5 min**	**10min**	**15 min**	**20 min**	**25 min**	**30 min**
Group M	N	40	40	40	40	40	40	40
	Mean	78.40	74.00	71.50	70.70	71.78	73.28	71.73
	SD	6.32	5.50	6.66	6.46	5.78	6.00	5.42
Group D	N	40	40	40	40	40	40	40
	Mean	84.48	74.13	73.08	71.60	71.48	73.13	72.08
	SD	8.98	5.14	4.55	5.49	6.10	6.27	5.99
P value Unpaired t Test		0.1318	0.9166	0.2212	0.5039	0.8219	0.9132	0.7847

Table 14 :

Mean Arterial Pressure		35min	40min	45 min	50 min	55 min	60min
Group M	N	40	40	40	40	40	40
	Mean	71.38	73.75	74.40	76.88	74.63	74.00
	SD	6.33	5.78	5.57	5.81	6.77	5.50
Group D	N	40	40	40	40	40	40
	Mean	71.35	73.88	74.28	77.25	75.65	74.10
	SD	6.17	5.29	5.67	5.51	6.26	5.21
P value Unpaired t Test		0.9858	0.9199	0.9210	0.7678	0.4840	0.9337

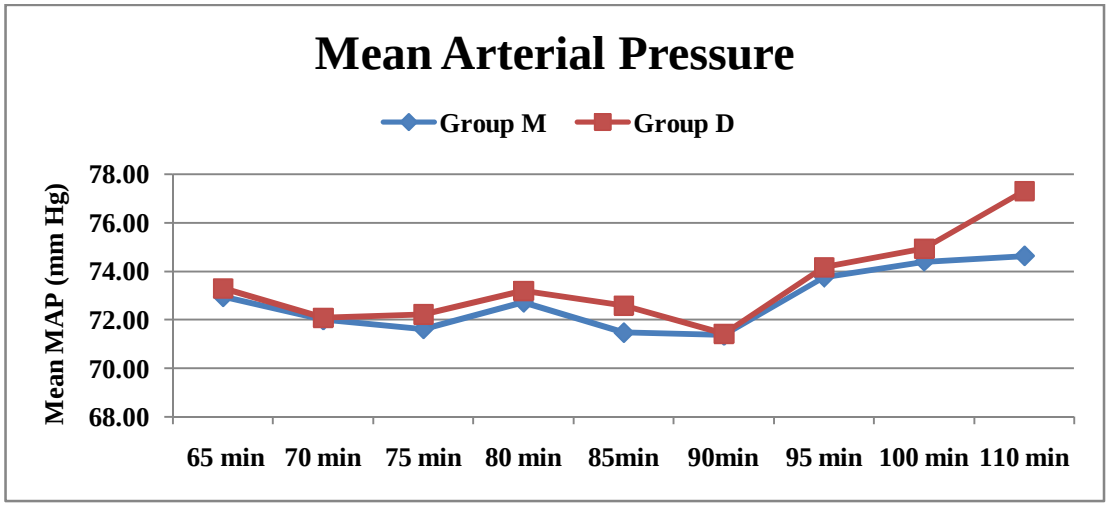

Figure 19 :

Table 15 :

Mean Arterial Pressure		65 min	70 min	75 min	80 min	85 min	90min	95 min	100 min	110 min
Group M	N	40	40	40	40	40	40	40	40	40
	Mean	72.95	72.00	71.63	72.73	71.48	71.38	73.75	74.40	74.63
	SD	6.12	5.18	5.56	5.93	5.54	6.33	5.78	5.57	6.77
Group D	N	40	40	40	40	40	40	40	40	40
	Mean	73.30	72.08	72.23	73.20	72.58	71.43	74.18	74.93	74.30
	SD	4.60	5.29	5.50	6.02	4.83	5.92	5.29	5.42	5.56
P value Unpaired t Test		0.7732	0.9491	0.6290	0.7231	0.3467	0.9710	0.7323	0.6704	0.0572

Majority of the meperidine group patients had mean arterial pressure ranging from 70.70 mm Hg to 76.88 mm Hg between baseline and 110 minutes intraoperatively. Similarly majority of the dexmedetomidine group patients had mean arterial pressure ranging from 72.08 mm Hg to 84.48 mm Hg between baseline and 110 minutes intraoperatively. The association between the intervention groups and mean arterial pressure is considered to be not statistically significant since $p > 0.05$ as per 2 tail unpaired t test.

TEMPERATURE

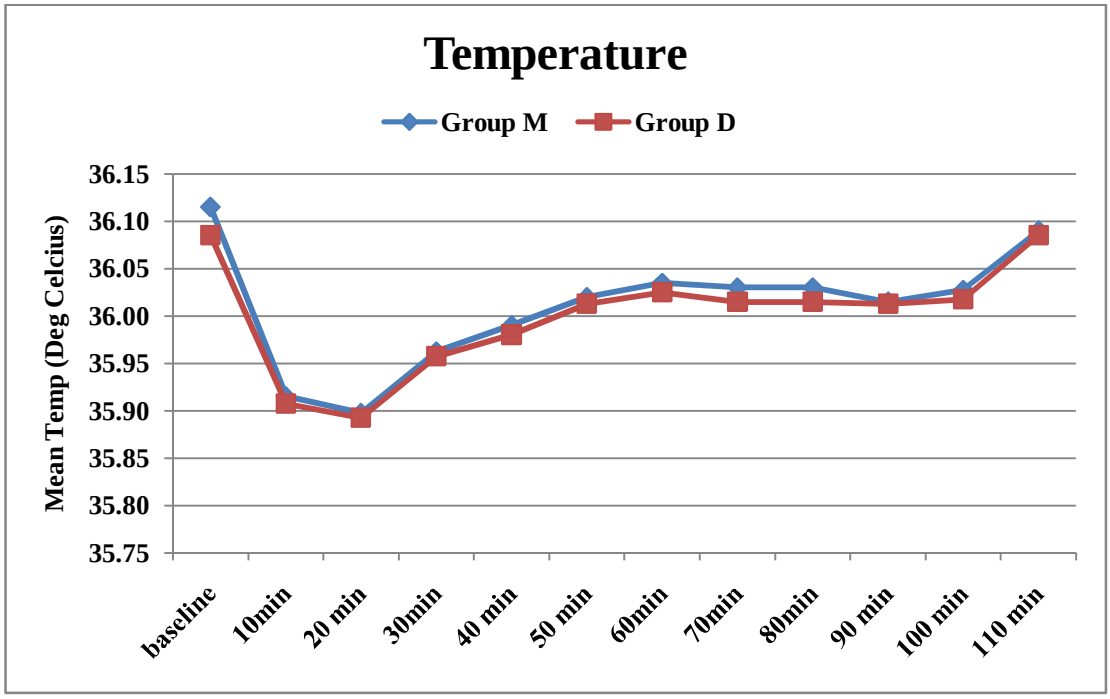

Figure 20 :

Table 16 :

Temperature		Baseline	10min	20 min	30min	40 min	50 min	60min
Group M	N	40	40	40	40	40	40	40
	Mean	36.12	35.92	35.90	35.96	35.99	36.02	36.04
	SD	0.22	0.18	0.15	0.14	0.13	0.15	0.14
Group D	N	40	40	40	40	40	40	40
	Mean	36.09	35.91	35.89	35.96	35.98	36.01	36.03
	SD	0.21	0.16	0.14	0.14	0.12	0.14	0.14
P value Unpaired t Test		0.5331	0.8443	0.8762	0.8736	0.7171	0.8192	0.7516

Table 17 :

Temperature		70min	80min	90 min	100 min	110 min
Group M	N	40	40	40	40	40
	Mean	36.03	36.03	36.02	36.03	36.09
	SD	0.14	0.14	0.13	0.15	0.20
Group D	N	40	40	40	40	40
	Mean	36.02	36.02	36.01	36.02	36.09
	SD	0.14	0.14	0.12	0.14	0.21
P value Unpaired t Test		0.6339	0.6339	0.9276	0.7626	0.9122

Majority of the meperidine group patients had mean temperature ranging from 36.12 ºC and 35.90 ºC between baseline and 110 minutes intraoperatively. Similarly majority of the dexmedetomidine group patients had mean temperature ranging from 35.89 ºC and 36.09 ºC between baseline and 110 minutes intraoperatively. The association between the intervention groups and mean temperature is considered to be not statistically significant since $p > 0.05$ as per 2 tail unpaired t test.

SHIVERING GRADE

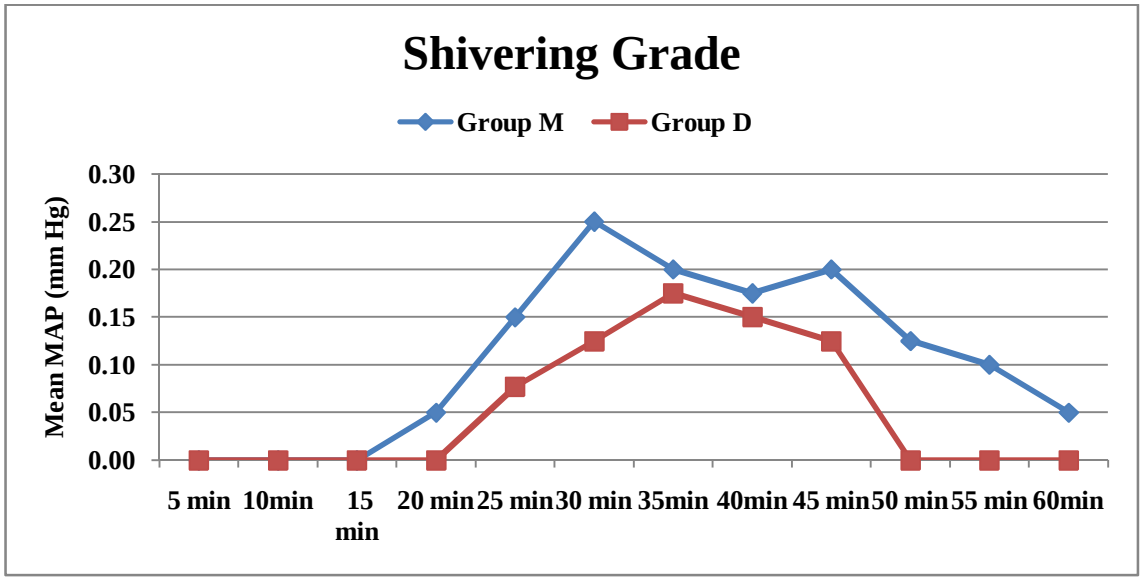

Figure 21 :

Table 18 :

Shivering Grade		5 min	10min	15 min	20 min	25 min	30 min
Group M	N	40	40	40	40	40	40
	Mean	0.00	0.00	0.00	0.05	0.15	0.25
	SD	0.00	0.00	0.00	0.32	0.66	0.78
Group D	N	40	40	40	40	39	40
	Mean	0.00	0.00	0.00	0.00	0.08	0.13
	SD	0.00	0.00	0.00	0.00	0.48	0.56
P value Unpaired t Test		NA	NA	NA	0.3235	0.5756	0.4125

Table 19 :

Shivering Grade		35min	40min	45 min	50 min	55 min	60min
Group M	N	40	40	40	40	40	40
	Mean	0.20	0.18	0.20	0.13	0.10	0.05
	SD	0.72	0.64	0.72	0.56	0.44	0.32
Group D	N	40	40	40	40	40	40
	Mean	0.18	0.15	0.13	0.00	0.00	0.00
	SD	0.64	0.66	0.56	0.00	0.00	0.00
P value Unpaired t Test		0.8700	0.8637	0.6064	0.1684	0.1599	0.3235

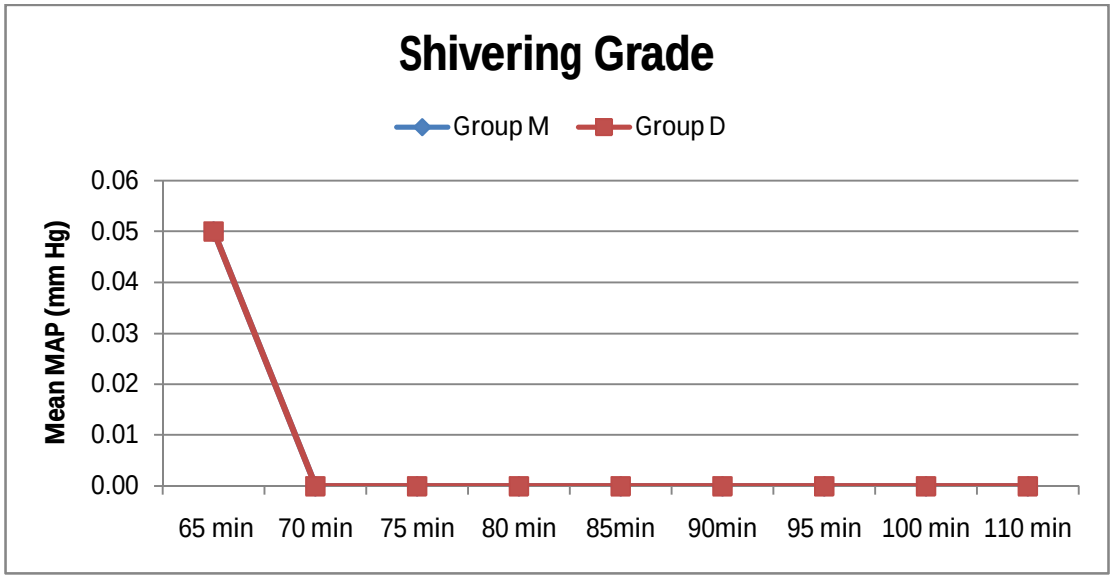

Figure 22 :

Table 20 :

Shivering Grade		65 min	70 min	75 min	80 min	85 min	90 min	95 min	100 min	110 min
Group M	N	40	40	40	40	40	40	40	40	40
	Mean	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SD	0.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Group D	N	40	40	40	40	40	40	40	40	40
	Mean	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SD	0.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P value Unpaired t Test		1.00	NA	NA	NA	NA	NA	NA	NA	NA

Majority of the meperidine group patients had mean shivering grade ranging from 0.00 to 0.05 between baseline and 65 minutes intraoperatively. Similarly majority of the dexmedetomidine group patients had mean shivering grade ranging from 0.00 and 0.05 between baseline and 65 minutes intraoperatively. The association between the intervention groups and mean shivering is considered to be not statistically significant since $p > 0.05$ as per 2 tail unpaired t test.

SEDATION SCORE

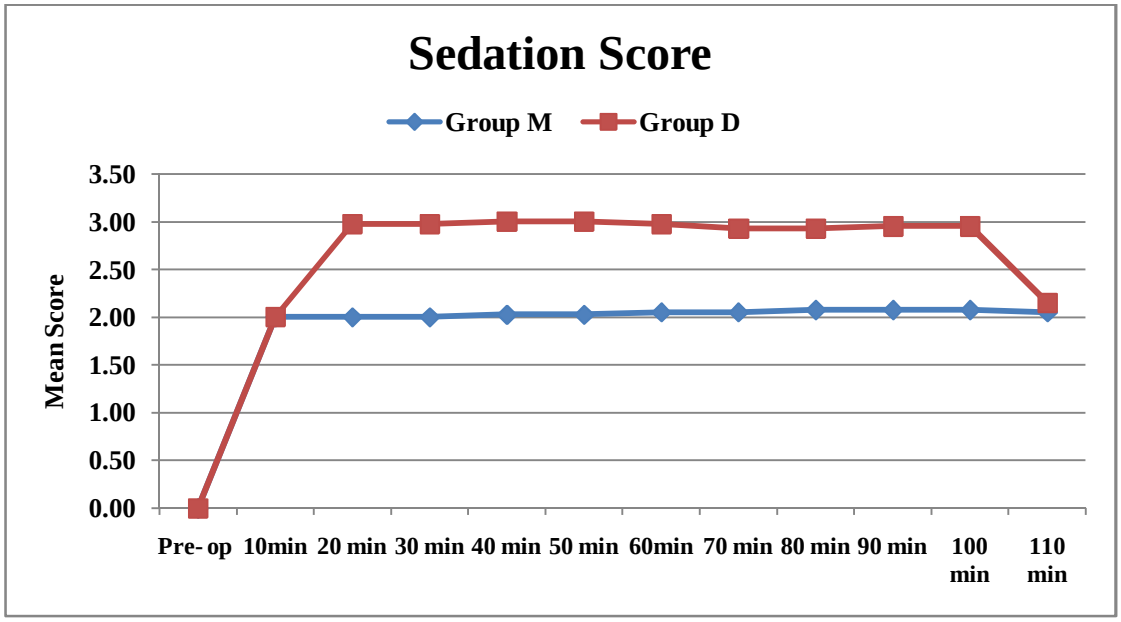

Figure 23 :

Table 21:

Sedation Score		Pre- op	10min	20 min	30 min	40 min	50 min	60min
Group M	N	40	40	40	40	40	40	40
	Mean	0.00	2.00	2.00	2.00	2.03	2.03	2.05
	SD	0.00	0.00	0.00	0.00	0.16	0.16	0.22
Group D	N	40	40	40	40	40	40	40
	Mean	0.00	2.00	2.98	2.98	3.00	3.00	2.98
	SD	0.00	0.00	0.16	0.16	0.00	0.00	0.16
P value Unpaired t Test				0.0000	0.0000	0.0000	0.0000	0.0000

Table 22 :

Sedation Score		70 min	80 min	90 min	100 min	110 min
Group M	N	40	40	40	40	40
	Mean	2.05	2.08	2.08	2.08	2.05
	SD	0.22	0.27	0.27	0.27	0.22
Group D	N	40	40	40	40	40
	Mean	2.93	2.93	2.95	2.95	2.15
	SD	0.27	0.27	0.22	0.22	0.36
P value Unpaired t Test		0.0000	0.0000	0.0000	0.0000	0.1404

The association between the intervention groups and mean sedation score is considered to be statistically significant from 20 and 100 minutes since $p < 0.05$ as per unpaired t test. In patients belonging to meperidine intervention group, the mean sedation score is decreased to an average of 1.84 points in comparison with patients belonging to dexmedetomidine intervention group in whom the mean sedation score is an average of 2.67 points. This indicates that there is a true difference among intervention groups and the difference is significant with a p-value of 0.0000 according to unpaired t-test.

RESPIRATORY RATE

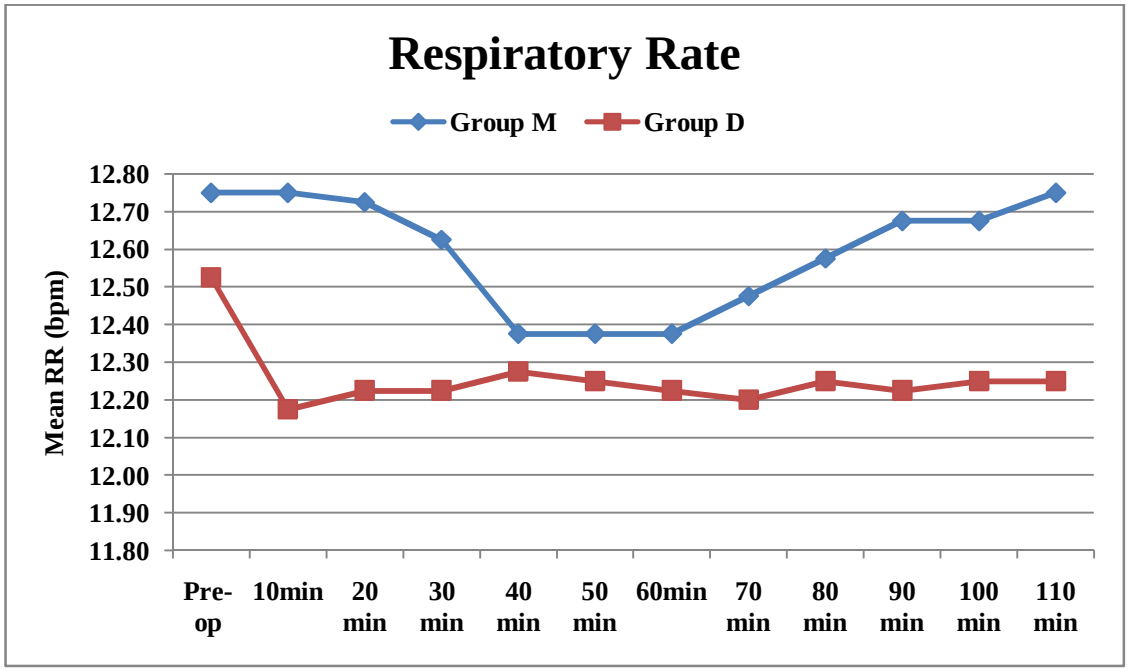

Figure 24 :

Table 23 :

Respiratory Rate		Pre- op	10min	20 min	30 min	40 min	50 min	60min
Group M	N	40	40	40	40	40	40	40
	Mean	12.75	12.75	12.73	12.63	12.38	12.38	12.38
	SD	0.84	0.84	0.82	0.77	0.93	0.93	0.84
Group D	N	40	40	40	40	40	40	40
	Mean	12.53	12.18	12.23	12.23	12.28	12.25	12.23
	SD	0.82	0.55	0.58	0.58	0.68	0.63	0.58
P value Unpaired t Test		0.2279	0.1177	0.2223	0.5107	0.5832	0.4824	0.3542

Table 24 :

Respiratory Rate		**70 min**	**80 min**	**90 min**	**100 min**	**110 min**
Group M	N	40	40	40	40	40
	Mean	12.48	12.58	12.68	12.68	12.75
	SD	0.96	0.75	0.80	0.76	0.84
Group D	N	40	40	40	40	40
	Mean	12.20	12.25	12.23	12.25	12.25
	SD	0.56	0.63	0.58	0.63	0.63
P value Unpaired t Test		0.1234	0.1388	0.3351	0.7183	0.4536

Majority of the meperidine Group patients had mean respiratory rate ranging from 12.38 breath per minute 12.75 breath per minute between baseline and 110 minutes intraoperatively. Similarly majority of the dexmedetomidine group patients had mean respiratory rate ranging from 12.18 breath per minute to 12.53 breath per minute between baseline and 110 minutes intraoperatively. The association between the intervention groups and respiratory rate is not statistically significant since $p > 0.05$ as per 2 tail unpaired t test.

PERIPHERAL CAPILLARY OXYGEN SATURATION

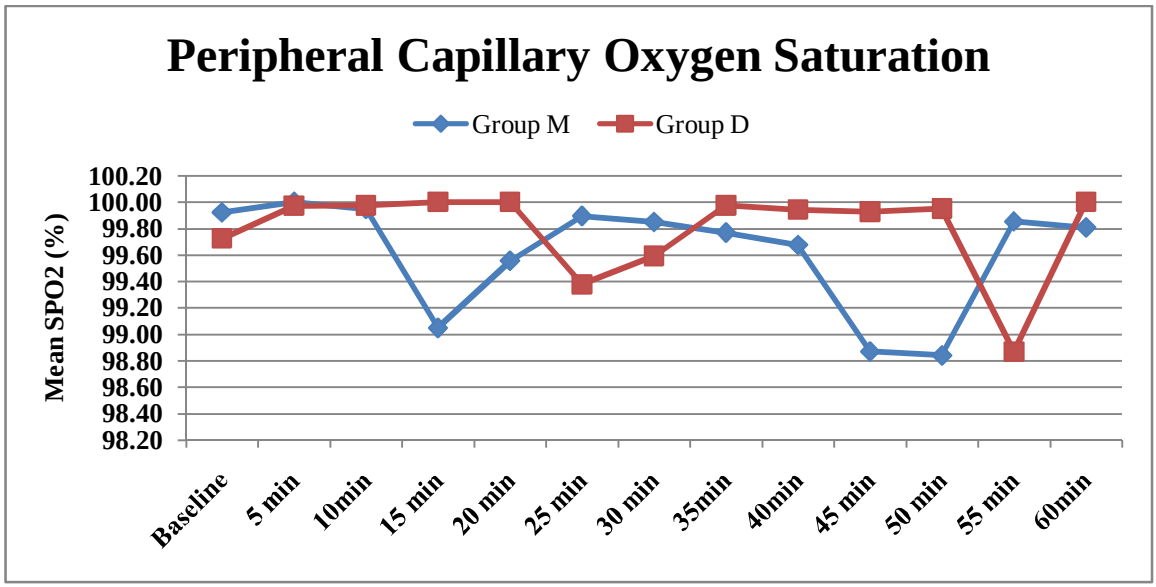

Figure 25 :

Table 25 :

Peripheral Capillary Oxygen Saturation		Baseline	5 min	10min	15 min	20 min	25 min	30 min
Group M	N	38	40	37	20	27	38	33
	Mean	99.92	100.00	99.95	99.05	99.56	99.89	99.85
	SD	0.27	0.00	0.23	0.83	0.75	0.45	0.51
Group D	N	40	35	38	40	35	29	27
	Mean	99.73	99.97	99.97	100.00	100.00	99.38	99.59
	SD	0.51	0.17	0.16	0.00	0.00	0.78	0.75
P value Unpaired t Test		0.0360	0.3244	0.5483	0.0001	0.0049	0.0027	0.1366

Table 26 :

Peripheral Capillary Oxygen Saturation		35min	40min	45 min	50 min	55 min	60min
Group M	N	26	37	39	38	34	26
	Mean	99.77	99.68	98.87	98.84	99.85	99.81
	SD	0.71	0.75	1.36	1.37	0.70	0.80
Group D	N	38	34	27	40	39	40
	Mean	99.97	99.94	99.93	99.95	98.87	100.00
	SD	0.16	0.24	0.27	0.22	1.36	0.00
P value Unpaired t Test		0.1609	0.6464	0.2788	0.1636	0.3112	0.2323

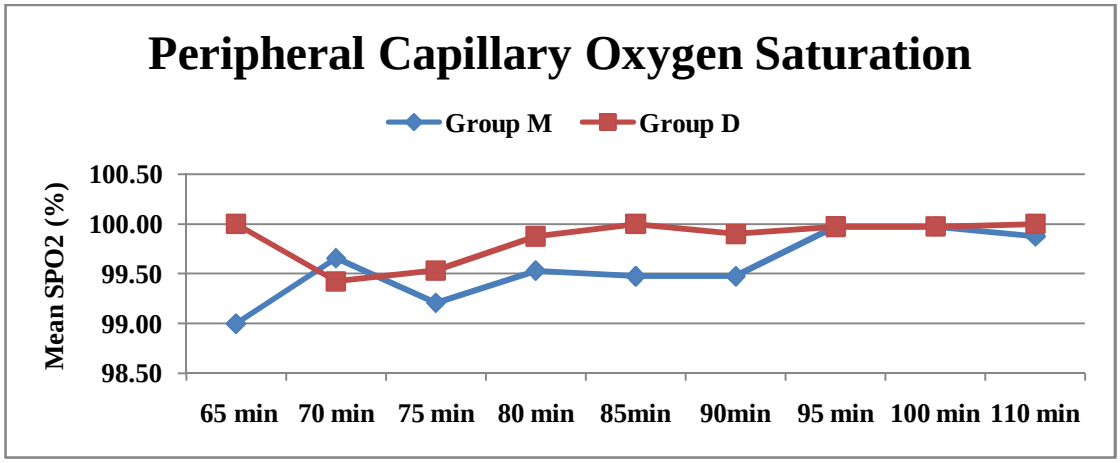

Figure 26 :

Table 27 :

Peripheral Capillary Oxygen Saturation		65 min	70 min	75 min	80 min	85 min	90 min	95 min	100 min	110 min
Group M	N	32	32	24	32	40	40	36	38	40
	Mean	99.00	99.66	99.21	99.53	99.48	99.48	99.97	99.97	99.88
	SD	1.19	0.70	0.72	0.84	0.85	1.11	0.17	0.16	0.40
Group D	N	39	33	32	40	40	40	35	39	40
	Mean	100.00	99.42	99.53	99.88	100.00	99.90	99.97	99.97	100.00
	SD	0.00	0.75	0.84	0.52	0.00	0.50	0.17	0.16	0.00
P value Unpaired t Test		0.4455	0.2024	0.1288	0.5483	0.6613	0.2312	0.9842	0.9854	0.0577

Majority of the meperidine group patients had mean peripheral capillary oxygen saturation ranging from 99.05% to 100% between baseline and 110 minutes intraoperatively. Similarly majority of the dexmedetomidine group patients had mean respiratory rate ranging from 99.38% to 100% between baseline and 110 minutes intraoperatively. The association between the intervention groups and mean mean peripheral capillary oxygen saturation is considered to be not statistically significant since $p > 0.05$ as per 2 tail unpaired t test.

NAUSEA/ VOMITING

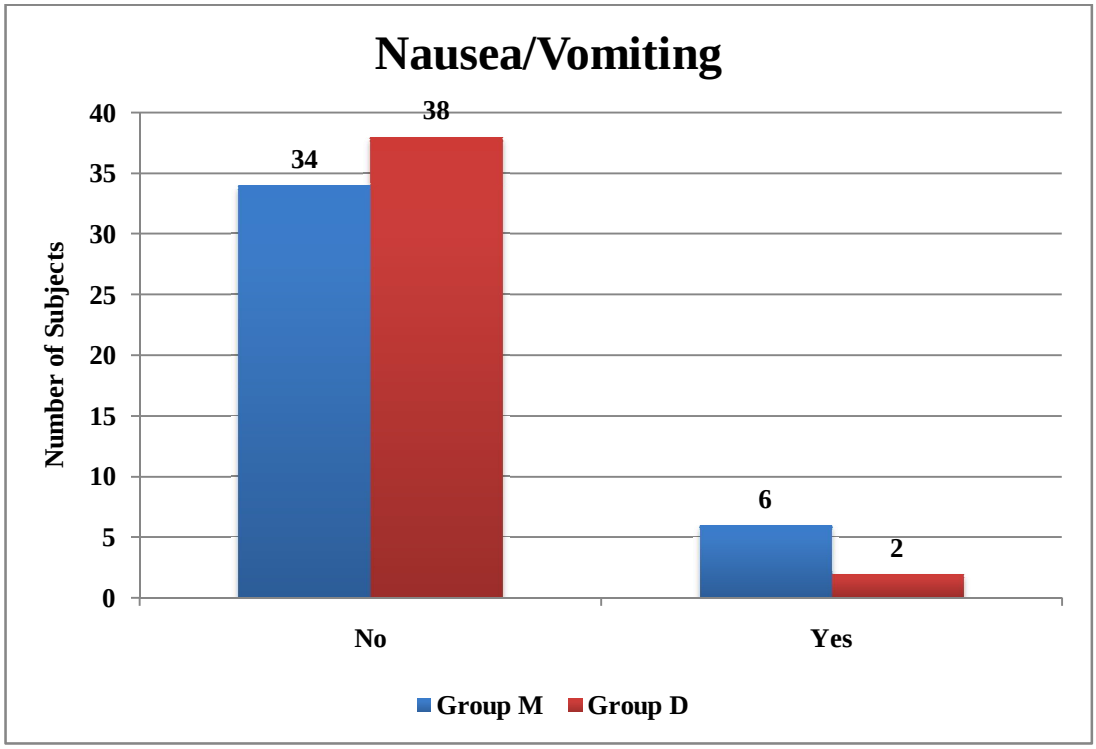

Figure 27 :

Table 28 :

Nausea/Vomiting	Group M	%	Group D	%
No	34	85.00	38	95.00
Yes	6	15.00	2	5.00
Total	40	100	40	100
P value Fishers Exact Test			0.9999	

In meperidine group, 6 patients had nausea/vomiting (n=6, 15%). In the dexmedetomidine group, only 2 had nausea/vomiting (n=2, 5%). The association between the intervention groups and incidence of nausea/vomiting is considered to be not statistically significant since p > 0.05 as per Fisher's exact test.

RESCUE DRUG

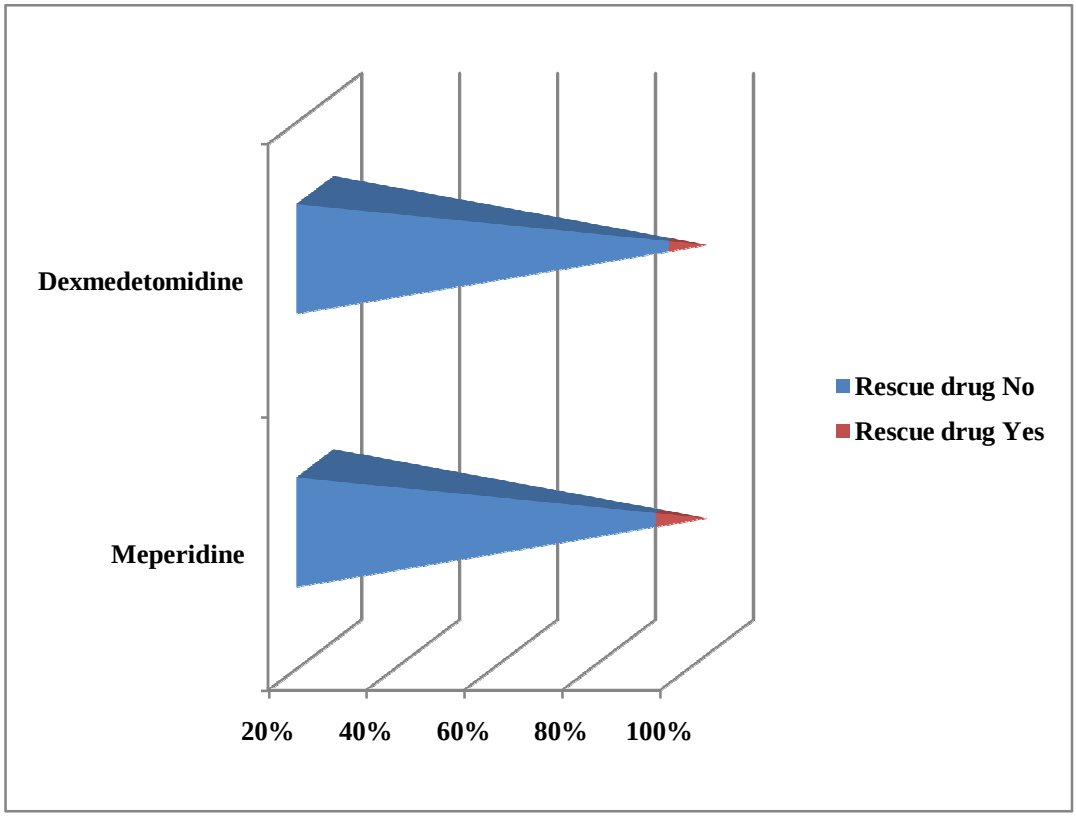

Figure 28 :

Table 29 :

Rescue	Meperidine	Dexmedetomidine
Yes	4	3
No	36	37

In this study, 4 patients in meperidine group and 3 patients in dexmedetomidine group required rescue drug.

HYPOTENSION

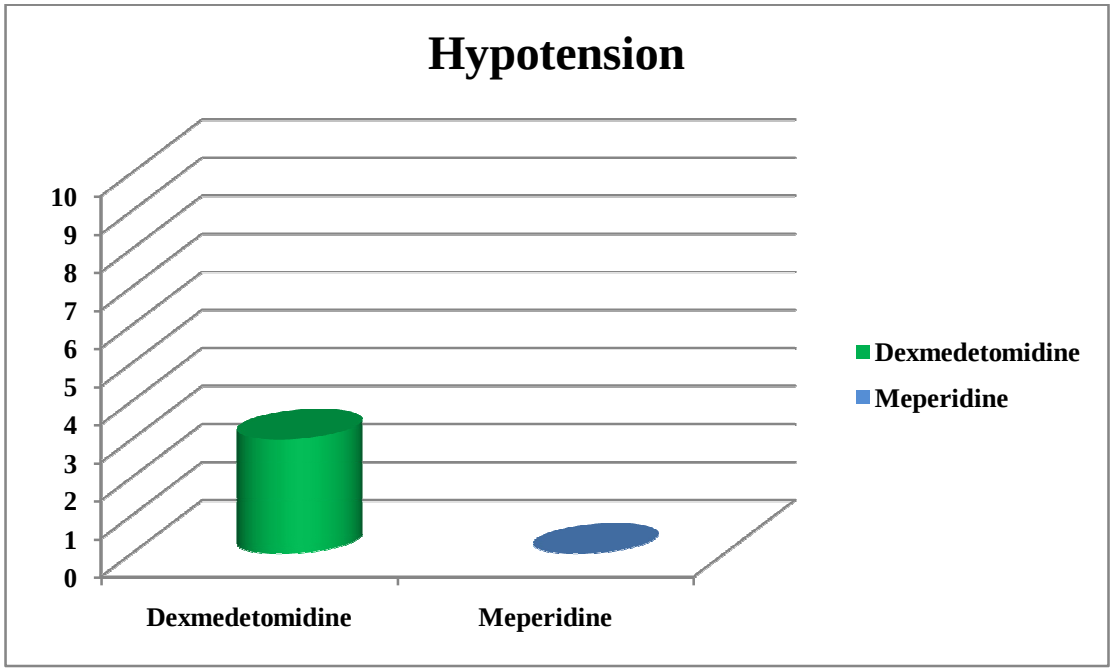

Figure 29 :

Table 30 :

Dexmedetomidine	Meperidine	p value
3	0	0.067

In this study, 3 patients from dexmedetomidine group had a fall in systolic blood pressure to less than 90 mm Hg during the study period. Patients in meperidine group did not have any hypotension. The p value for this is 0.067 which is not significant.

BRADYCARDIA

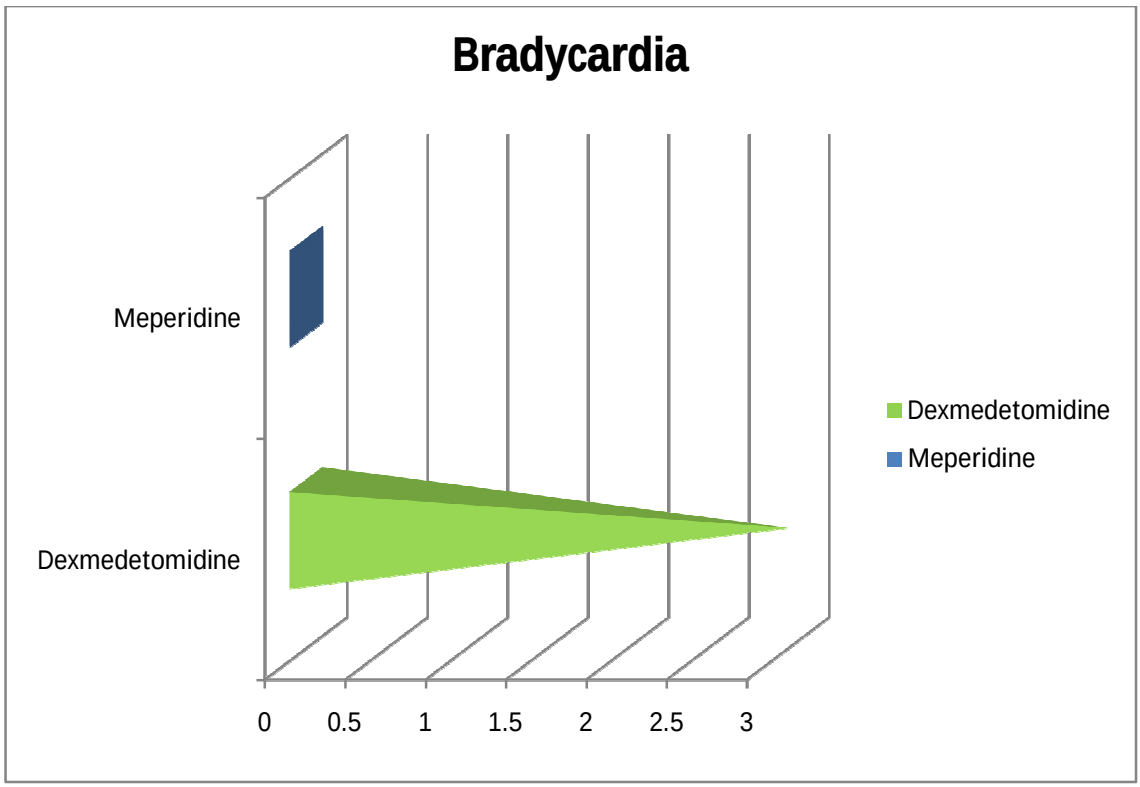

Figure 30 :

Table 31 :

Dexmedetomidine	Meperidine	p value
3	0	0.067

In this study, no patient from meperidine group had bradycardia but three patients from dexmedetomidine group had a fall in heart rate of less than 50 beats per minute. The p value is 0.067 which is not statistically significant.

DISCUSSION

Shivering continues to be a common problem faced by the anaesthesiologist during intra operative and post operative periods following spinal anaesthesia. Unfortunately, there is no gold standard drug or definitive strategy drawn in management of this commonly encountered problem. Multiple neurotransmitter pathways have been found to involve in shivering and most of the drugs like opioids (pethidine & tramadol), doxapram, ketanserin, propofol, ketamine, clonidine and nefopam used acts on these pathways to control shivering. However, adverse effects such as hypotension, sedation, respiratory depression, nausea and vomiting limit their use.

So, the search for an ideal anti-shivering agent with fewer side effects is continuing. Many studies were available regarding treatment of intraoperative shivering but only few studies were available for prevention of shivering by prophylactic administration of antishivering agents.

Hence, this study was undertaken to study and compare the effectiveness of dexmedetomidine and meperidine in the prevention of intraoperative shivering in patients undergoing elective lower abdominal surgeries under spinal anesthesia. Also in this study, we compared the side effect profile of these drugs.

In our study, age group of patients included was between 18 to 60yrs. Mean age in meperidine group was 38.28yrs and in dexmedetomidine group was 33.28yrs. Age group of patients included in the study by Usta et al were between 18 to 50yrs. Mean age in Dexmedetomidine group was 36 yrs and in control group it was 37yrs.

Age group of patients included in the study by Geetha et al was between 18 and 65 yrs. Mean age in dexmedetomidine group was 38yrs and in tramadol group was 37 yrs. There was no significant difference between the age group selected in our study, Usta et al and Geetha et al. Hence selection bias was excluded.

In our study, male : female ratio in meperidine group is 55% : 45% and in dexmedetomidine group it is 50% each. Usta et al in his study showed the male : female ratio as 75% : 25% in dexmedetomidine group and 70% : 30% in control group. Geetha et al in her study showed the male : female ratio as 60% : 40% and 52% : 48% in tramadol group. There was no statistically significant difference between gender selection in our study, Usta et al and Geetha et al. This strengthens our study.

In our study, mean weight of patients in meperidine group was 59.38 kg and in dexmedetomidine group, it was 61.25 kg. Mean weight of the patient in the study by Usta et al was 80kg both in dexmedetomidine and control group (normal saline). There was no statistically significant

difference the weight selection between the groups in our study and Usta et al. Hence selection bias was excluded.

In our study, mean height of patients in meperidine group was 1.61 meters and in dexmedetomidine group it was 1.62 meter. Mean height of the patient in the study by Usta et al was 1.70 metre in dexmedetomidine and 1.73 meter in control group (normal saline). There was no statistically significant difference the height selection between the groups in our study and Usta et al. Hence, selection bias was excluded.

In our study, majority of the dexmedetomidine group patients belonged to the ASA 1 group (n=33, 82.50%). In the meperidine group patients, majority belonged to the ASA 1 group (n=31, 77.50%). In the study by Fern and Misiran showed that dexmedetomidine group was shared equally between ASA 1 and ASA 2 groups (50% each) and majority in meperidine group belonged to ASA 2 group (75%). The association between the intervention groups and ASA classification is considered to be not statistically significant both in our study and Fern & Misiran study.

Few studies have attempted to study the correlation between heart rate, mean arterial pressure, temperature, shivering grade, respiratory rate, oxygen saturation and side effect profile of tramadol, normal saline and other drugs with dexmedetomidine. But there are no studies comparing the effectiveness between meperidine and dexmedetomidine in

preventing shivering perioperatively in lower abdominal surgeries under spinal anaesthesia.

In our study, majority of the meperidine Group patients had mean heart rate ranging from 84.28 to 74.45 between baseline and 110 minutes intraoperatively. Similarly majority of the dexmedetomidine Group patients had mean heart rate ranging from 82.63 and 74.00 between baseline and 110 minutes intraoperatively. In the study by Usta et al, majority of the normal saline group had mean heart rate ranging from 88 to 85 bpm and in dexmedetomidine group it was ranging from 90 to 70 bpm between baseline and 110min intra operatively. The association between the intervention groups and mean heart rate was considered to be not statistically significant in our study and in the study by Usta et al it is statistically significant as the comparison in this study was between normal saline and dexmedetomidine.

In our study, majority of the meperidine Group patients had mean arterial pressure at baseline of 78.40 mm Hg and at 110 minutes of 74.63 mm Hg intraoperatively respectively. Similarly majority of the dexmedetomidine Group patients had mean arterial pressure at baseline of 84.48 mm Hg and at 110 minutes of 74.30 mm Hg intraoperatively respectively. In the study by Usta et al, majority of the normal saline group had mean arterial pressure ranging from 90 to 88 mm of Hg and in dexmedetomidine group it was ranging from 90 to 78 mm of Hg between

baseline and post operatively respectively. The association between the intervention groups and mean arterial pressure was considered to be not statistically significant both at baseline and post operatively in our study but p value was significant when mean arterial pressure was compared pre and post op in dexmedetomidine group.

In the study by Usta et al it is statistically significant only when mean arterial pressure in patients treated with the normal saline group and dexmedetomidine group compared post operatively. This confirms that dexmedetomidine known to cause fall in mean arterial pressure perioperatively.

In our study, majority of the meperidine group patients had mean temperature ranging from 36.12 C and 35.90°C between baseline and 110 minutes intraoperatively. Similarly majority of the dexmedetomidine group patients had mean temperature ranging from 35.89°C and 36.09°C between baseline and 110 minutes intraoperatively. Usta et al in his study showed the mean temperature for saline group ranges from 36.8 to 36.1°C and in dexmedetomidine group between 36.9 to 36.0°C. The association between the intervention groups and mean temperature is not statistically significant both in our study and Usta et al study.

In our study, out of 80 patients 3 patients in dexmedetomidine group and 4 patients in meperidine group developed shivering with

lowest time of onset of shivering were 25 min in dexmedetomidine group and 20 min in meperidine group. Both dexmedetomidine and meperidine group patients had shivering grade ranging from 2 to 3 between baseline and 65 minutes intraoperatively, which was not statistically significant. Those patients who developed shivering in both the groups were given dexmedetomidine as a rescue drug with dose of 0.3µg/kg body weight and shivering completely resolved in all the patients within 5 to 10 minutes except one in meperidine group. Fern and Misiran in their study demonstrated that all the three drugs dexmedetomidine, pethidine and tramadol were effective in treating post-neuraxial anaesthesia shivering. dexmedetomidine appears to be more effective than pethidine and tramadol (100% vs. 85% vs. 55%, respectively). However, the only significant difference statistically was demonstrated only between dexmedetomidine and tramadol and not between other drugs in reducing post-neuraxial anaesthesia shivering.

In our study, sedation scores at intraoperative 20^{th} to 100^{th} min in dexmedetomidine group were significantly higher than the baseline values and values in meperidine group which was statistically significant. Most of the patients in dexmedetomidine group achieved the sedation score of 3 and in meperidine group achieved the score of 2. Fern and Misiran in their study showed significant difference in sedation score among dexmedetomidine, meperidine and tramadol group respectively. In

the study by Bozgeyik et al, showed average sedation score of 3 in dexmedetomidine group which was statistically significant when compared to average score 2 in tramadol group intraoperatively. This sedation score in dexmedetomidine group might have removed anxiety in patients.

In our study respiratory rate, oxygen saturation and side effect profile were not statistically significant. This observation was confirmed by similar findings in the study by Asif iqbal et al stating no significant difference in these variables between the study drugs. Asif iqbal et al in their study compared granisetron with meperidine.

CONCLUSION

1. In our study, both the dexmedetomidine and meperidine were effective in the prevention of post spinal shivering.

2. Dexmedetomidine had better sedation profile without any respiratory depression and had less incidence of nausea and vomiting when compared to pethidine. So, it can be used as a better alternate for shivering prophylaxis in patients undergoing surgeries under regional anaesthesia .

LIMITATIONS

1. Further studies are needed to evaluate the efficacy of dexmedetomidine in shivering control using different doses of dexmedetomidine.
2. Haemodynamic effects of dexmedetomidine are to be studied in surgeries with longer duration where the chance of developing hypothermia is more.
3. We could not measure the core body temperature. For measurement of core body temperature, the probe needs to be put in the oesophagus or near the tympanic membrane. Both these are uncomfortable and unacceptable who has been given spinal anaesthesia. Rectal temperature monitoring was a possibility but was not tried.

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ABBREVIATIONS

1. I.V - intravenous
2. I.M - intramuscular
3. S.C - subcutaneous
4. BPM - beats per minute
5. RR - respiratory rate
6. MAP - mean arterial pressure
7. SAB - Subarachnoid block

ETHICAL COMMITTEE APPROVAL CERTIFICATE

INSTITUTIONAL ETHICAL COMMITTEE
GOVT. KILPAUK MEDICAL COLLEGE,
CHENNAI-10
Protocol ID. No.07/03/2015 Meeting held on 26/03/2015
CERTIFICATE OF APPROVAL

The Institutional Ethical Committee of Govt. Kilpauk Medical College, Chennai reviewed and discussed the application for approval "A Comparative Study between dexmedetomidine and meperidine in the prevention of intraoperative shivering in patients undergoing elective lower abdominal surgeries under spinal anesthesia – For Dissertation Purpose" submitted by Dr.S.Amudhavan, MD (Anaesthesia), Post Graduate Student, Govt. Kilpauk Medical College, Chennai.

The Proposal is APPROVED.

The Institutional Ethical Committee expects to be informed about the progress of the study any Adverse Drug Reaction Occurring in the Course of the study any change in the protocol and patient information /informed consent and asks to be provided a copy of the final report.

CHAIRMAN,
Ethical Committee
Govt. Kilpauk Medical College, Chennai

Comp<E Colon< MEI Sec<Ethical Committee 1

PARTICIPANT INFORMATION SHEET

We are conducting a study on the ""**A Comparative study between Dexmedetomidine and meperidine in the prevention of intraoperative shivering in patients undergoing elective lower abdominal surgeries under spinal anaesthesia"** at the Department of Anaesthesiology, Govt. Kilpauk Medical College and Govt. Royapettah Hospital, Chennai. The aim of this study was to compare the effectiveness of Dexmedetomidine and meperidine in the prevention of intraoperative shivering in patients undergoing lower abdominal surgeries under spinal anaesthesia during the period March 2015 to July 2015.

- The privacy of the patients in the research will be maintained throughout the study. In the event of any publication or presentation resulting from the research, no personally identifiable information will be shared.

- Taking part in this study is voluntary. You are free to decide whether to participate in this study or to withdraw at any time. Your decision will not result in any loss of benefits to which you are otherwise entitled.

- The results of the study may be intimated to you at the end of the study period or during the study if anything is found abnormal which may aid in the management or treatment.

Signature of the investigator **Signature of the Participant**

Date:

ஆராய்ச்சி தகவல் தாள்

கிழ்பாக்கம் மற்றும் ராயப்??ட்டா அரசு பொது மருத்துவமனையில் கீழ் முதுகு மயக்க நோயாளிகள் அடிவயிற்றின் அறுவைசிகிச்சையின் போது உடல் நடுக்கம் தடுப்பு மீதான ஆய்வில் டெக்ஸ்மெடெடோமைடின் மற்றும் மெபெரிடின் ? ? ??? ஒரு ஒப்புமை **குறித்து ஆராய்ச்சி** செய்ய உள்ளோம்.

நீங்கள் இந்த ஆராய்ச்சியில் பங்கேற்க நாங்கள் விரும்புகிறோம். இந்த ஆராய்ச்சியில் பங்கேற்பதால் தங்களது நோயின் ஆய்வறிக்கையோ அல்லது சிகிச்சையோ பாதிக்கப்படாது என்பதையும் தெரிவித்துக் கொள்கிறோம்.

இந்த ஆராய்ச்சியின் முடிவுகளை அல்லது கருத்துகளை வெளியிடும் போதோ அல்லது ஆராய்ச்சியின் போதோ தங்களது பெயரையோ அல்லது அடையாளங்களையோ வெளியிடமாட்டோம் என்பதையும் தெரிவித்துக் கொள்கிறோம்.

இந்த ஆராய்ச்சியில் பங்கேற்பது தங்களுடைய விருப்பத்தின் பேரில் தான் இருக்கிறது. மேலும் நீங்கள் எந்நேரமும் இந்த ஆராய்ச்சியில் இருந்து பின்வாங்கலாம் என்பதையும் தெரிவித்துக்கொள்கிறோம்.

இந்த சிறப்புப் பரிசோதனைகளின் முடிவுகளை ஆராய்ச்சியின் போதோ அல்லது ஆராய்ச்சியின் முடிவின் போதோ தங்களுக்கு அறிவிப்போம் என்பதையும் தெரிவித்துக்கோள்கிறோம்.

ஆராய்ச்சியாளர் கையொப்பம் பங்கேற்பாளர் கையொப்பம்

????

நோயாளி ஒப்புதல் படிவம்

ஆராய்ச்சியின் விவரம் :

ஆராய்ச்சி மையம் : அரசு கீழ்பாக்கம் மருத்துவக் கல்லூரி மருத்துவமனை

நோயாளியின் பெயர் : நோயாளியின் வயது:

பதிவு எண் :

நோயாளி கீழ்கண்டவற்றுள் கட்டங்களை (✓) செய்யவும்

1 மேற்குறிப்பிட்டுள்ள ஆராய்ச்சியின் நோக்கத்தையும் பயனையும் முழுவதுமாக புரிந்து கொண்டேன். மேலும் எனது அனைத்து சந்தேங்களையும் கேட்டு அதற்கான விளக்கங்களையும் தெளிவுபடுத்திக் கொண்டேன். ☐

2 மேலும் இந்த ஆராய்ச்சிக்கு எனது சொந்த விருப்பத்தின் பேரில் பங்கேற்கிநேன் என்றும், மேலும் எந்த நேரத்திலும் எவ்வித முன்றிவிப்பு மின்றி இந்த ஆராய்ச்சியிலிருந்து விலக முழுமையான உரிமை உள்ளதையும் இதற்கு எவ்வித சட்ட பிணைப்பும் இல்லை என்பதையும் அறிவேன். ☐

3 ஆராய்சியாளரோ, ஆராய்ச்சி உதவியாளரோ, ஆராய்ச்சி உபயத்தாரரோ, ஆராய்ச்சி பேராசிரியரோ, ஒழுங்குநெறி செயற்குழு உறுப்பினர்களோ எப்போது வேண்டுமானாலும் எனது அனுமதியின்றி எனது உள்நோயாளி மற்றும் புற நோயாளி பதிவுகளை இந்த ஆராய்ச்சிக்காகவோ அல்லது எதிர்கால பிறஆராய்ச்சிகளுக்காகவோ பயன்படுத்திக் கொள்ளலாம் என்றும் மேலும் இந்த நிபந்தனை நான் இவ்வராய்ச்சிலிருந்து தகும் என்றும் ஒப்புக்கொள்கிறேன். ஆயினும் எனது அடையாளம் சம்பந்தப்பட்ட எந்த பதிவகளும் (சட்டபூர்வமான தேவைகள் தவிர) வெளியிடப்படமாட்டது என்ற உறுதிமொழியின் பெயரில் இந்த ஆராய்ச்சிலிருந்து கிடைக்கப்பெறும் முடிவுகளை வெளியிட மறுப்பு தெறிவிக்கமாட்டேன் என்று உறுதியளிக்கிறேன். ☐

4. இந்த ஆராய்ச்சிஆச்ன வாயின் அருகில் வரும் சீழ் கட்டியை குறித்தது. அந்த நோயின் தன்மையையும், பின் விளைவுகளையும் பற்றியும், அறுவை சிகிச்சையின் போது கீறி எடுக்கப்படும் சீழை பரிசோதனைக்கு அனுப்பி கிருமியின் தன்மையையும் அதற்கு உகந்த மருந்தை பற்றியும் அறிய நடத்தும் ஆராய்ச்சி என்பதை மருத்துவர் மூலம் அறிந்து கொண்டேன். ☐
5. இந்த ஆராய்ச்சிக்கு நான் முழுமனதுடன் சம்மதிக்கின்றேன் என்றும் மேலும் ஆராய்ச்சி குழுவினர் எனக்கு அளிக்கும் அறிவுரைகளை தவறாது பின்பற்றுவேன் என்றும் உறுதியளிக்கிறேன். ☐
6. இந்த ஆராய்ச்சிக்குத் தேவைப்படும் அனைத்து மருத்துவப்பரிசோதனைகளுக்கும் ஒத்துழைப்பு தருவேன் என்று உறுதியளிக்கிறேன். ☐
7. இந்த ஆராய்ச்சிக்கு யாருடைய எற்புறுத்தலுமின்றி எனது சொந்த விருப்பத்தின் பேரிலும் சுயஅறிவுடனும் முழுமனதுடனும் சம்மதிக்கின்றேன் என்று இதன் மூலம் ஒப்புக்கொள்கிறேன். ☐

நோயாளியின் கையொப்பம் / பெருவிரல் கைரேகை
இடம்: தேதி:

ஆராய்ச்சியாளரின் கையொப்பம்:
இடம்: தேதி:

PATIENT CONSENT FORM

Study title: "**COMPARATIVE STUDY BETWEEN DEXMEDETOMIDINE AND MEPERIDINE IN THE PREVENTION OF INTRAOPERATIVE SHIVERING IN PATIENTS UNDERGOING LOWER ABDOMINAL SURGERIES UNDER SPINAL ANESTHESIA**

Paticipant name: Age: Sex:

I.P. No:

I confirm that I have understood the purpose of the procedure for the above study. I have the opportunity to ask the question and all my questions and doubts have been answered to my satisfaction.

I have been explained about the pitfall of the procedure. I have been explained about the safety, advantage and disadvantage of the technique.

I understand that my participation in the study is voluntary and that I am free to withdraw at anytime without giving any reason.

I understand that investigator, regulatory authorities and the ethical committee will not need my permission to look at my health records both in respect to the current study and any further research that may be conducted in relation to it, ven if I withdraw from the study. I understand that my identity will not be revealed in any information released to the third parties or published, unless as required under the law. I agree not to restrict the use of any data or results that arise from the study.

Time: Signature/thumb impression of the participant:

Date: Name of the Participant:

Place:

Signature of the investigator:

Name of the investigator:

PROFORMA

“COMPARATIVE STUDY BETWEEN DEXMEDETOMIDINE AND MEPERIDINE IN THE PREVENTION OF INTRAOPERATIVE SHIVERING IN PATIENTS UNDERGOING LOWER ABDOMINAL SURGERIES UNDER SPINAL ANESTHESIA”

Name :

Age/Gender :

IP. Number:

Height: Weight:

Date of surgery:

ASA Physical status:

Co morbidity :

Drug history:

Group (Tick any one)

□ Group-D: 0.5% Bupivacaine 3.5ml intrathecal+ 0.5mcg per kg dexmedetomidine iv infusion in 100ml NS

□ Group-M: 0.5% Bupivacaine 3.5ml intrathecal + 0.5mg per kg meperidine iv bolus in 100 ml NS

Duration of surgery :

Medications :

Inj. Atropine -0.6mg i.v if PR< 50/min.

Inj. Ephedrine 6 mg bolus if MAP falls below 20% of the baseline.

Oxygen supplementation

Inj. Ondansetron 8mg I.V if the patient develops nausea and vomiting.

OBSERVATION

TIME	SpO_2	R R	MAP	Heart rate	Shivering scale	Temperature
5 Min. after SAB¶						
10 Min. after SAB. ¶						
15 Min. after SAB. ¶						
20 Min. after SAB¶.						
25 Min. after SAB. ¶						
30 Min. after SAB. ¶						
35 Min. after SAB. ¶						
40 Min. after SAB. ¶						
45 Min. after SAB¶						
50 Min. after SAB¶.						
55 Min. after SAB. ¶						
60 Min. after SAB¶.						
65 Min. after SAB. ¶						
70 Min. after SAB. ¶						
75 Min. after SAB. ¶						
80 Min. after SAB. ¶						
85 Min. after SAB. ¶						
90 Min. after SAB. ¶						

Till the end of the surgery

Motor blockade (Bromage scale)*:

Time	5 min	10 min	15 min	20 min
Motor level				

*By Bromage scale every 5 minutes till it reaches the grade 4

Sedation score:(Ramsay Sedation Scale (RSS)*:

Time	Sedation level
Baseline	
10 min. after SAB¶	
20 min. after SAB¶	
30 min. after SAB¶	
40 min. after SAB¶	
50 min. after SAB¶	
60min. after SAB¶	
70 min. after SAB¶	
80 min. after SAB¶	
90 min. after SAB¶	
100 min. after SAB¶	
110 min . after SAB¶	

¶SAB-subarachnoid block

Any other complications seen:

MASTER CHART

MEPERIDINE[PETHIDINE]

Sl. No.	Name	Age	Sex	Weight	ASA	Height in cms	Ip No	Surgery	Heart rate										
									Baseline	5 min	10min	15 min	20 min	25 min	30 min	35min	40min	45 min	50 min
1	Selvaraj	35	M	65	1	168	2952	Rt Inguinal hernioplasty	82	70	74	78	86	82	77	80	86	87	84
2	Sekar	32	M	58	1	164	2853	Lt Inguinal hernioplasty	76	74	81	84	84	83	86	75	77	73	67
3	Raja	40	M	45	1	170	2581	Appendicectomy	86	89	82	102	102	94	96	90	94	78	72
4	Vasanthi	43	F	54	2	158	2937	Onlay meshplasty	78	82	84	80	75	70	65	65	63	69	60
5	kalidas	48	F	55	1	169	2790	B/L hernioplasty	84	86	82	84	83	84	68	78	76	80	74
6	Mohd.iqbal	27	M	76	1	170	2342	L varicocelectomy	90	98	96	100	104	92	90	88	86	84	84
7	Dhanasekar	52	M	63	2	166	3093	B/L eversion of sac	76	82	88	86	78	74	72	70	70	72	70
8	Arivukarasu	28	M	52	1	168	3349	Appendicectomy	96	90	88	90	86	84	88	90	92	92	90
9	Prakash	24	M	70	1	164	3358	Appendicectomy	88	85	89	82	80	81	84	80	78	81	78
10	Muthu	44	M	72	2	160	3509	Rt Inguinal hernioplasty	86	82	64	58	68	68	76	74	82	70	72
11	Esther	48	F	55	1	156	1468	TAH with BSO	90	96	98	97	92	88	84	86	80	82	80
12	Mariyammal	51	F	45	1	154	1620	TAH with BSO	86	80	88	84	92	92	94	90	88	78	77
13	Kosala	44	F	48	1	155	1428	Vaginal hysterectomy	78	80	82	75	74	72	70	68	69	70	71
14	Unnamalai	56	F	56	2	158	1642	Vaginal hysterectomy	93	94	97	88	89	85	80	81	80	82	82
15	Pattammal	56	F	49	1	152	1623	VH with PFR	70	64	66	64	68	68	60	67	69	70	68
16	kumar	27	M	68	1	170	8626	Lt.Varicoelectomy	86	98	96	80	68	70	71	72	74	66	68
17	kanchana	48	F	56	1	156	1518	TAH	74	72	70	68	67	66	69	67	68	70	67
18	Rajeswari	34	F	50	1	160	1573	Ovarian cystectomy	90	84	85	94	103	106	96	92	90	86	87
19	Velmurugan	28	M	68	1	168	3466	Haemorroidectoy	92	91	84	81	88	86	84	80	81	72	74
20	S anthi	30	F	54	1	152	1480	Staging laprotomy &proceed	85	80	70	98	94	70	73	66	69	68	63
21	RanjIth	38	M	74	1	166	3773	Appendicectomy	78	76	75	70	68	66	62	58	59	62	61
22	Anbukarasi	39	F	56	1	169	1693	TAH	92	88	93	94	96	97	98	82	80	83	80
23	Karmegam	45	M	66	1	172	3423	B/L eversion of sac	83	96	95	94	92	80	82	78	75	74	79
24	Suresh	34	M	68	2	169	8499	vesicolithotripsy	93	92	94	104	106	103	91	90	82	83	80
25	Balachander	36	M	75	2	166	8919	vesicolithotripsy	88	82	84	80	78	73	77	73	78	75	72
26	mariyaal	47	M	52	1	152	1735	TAH with BSO	76	78	86	82	90	80	79	78	74	76	78
27	Banupriya	39	F	61	1	160	1780	Staging laprotomy	88	66	64	72	71	70	68	70	72	73	71
28	Senthilkumar	37	M	65	1	169	2772	L Hernioplasty	89	95	98	93	90	88	86	85	88	82	80
29	rathinam	48	F	53	1	157	1984	Vaginal hysterctomy	82	86	85	80	84	80	79	80	82	76	81
30	Anjalai	52	F	52	2	154	1953	TAH with BSO	85	98	97	94	95	90	88	86	82	86	80
31	Nagaraj	45	M	71	2	168	2911	R Hernioplasty with Hydrocele	78	82	83	80	81	82	80	75	77	74	72
32	Devi	28	F	48	1	160	1969	Ovarian cystectomy	82	84	86	85	87	89	79	79	73	74	75
33	Venkatesan	46	M	68	1	176	2968	B/L Hernioplasty	71	79	82	76	72	74	73	70	72	76	68
34	Jeyavel	19	M	72	1	168	2746	L inguinal hernioplasty	90	98	102	100	96	93	86	83	80	81	80
35	Sathyabama	26	F	53	1	158	1908	Marsupialization R Ovary	76	79	80	74	71	70	58	59	62	64	62
36	Marie	43	F	71	2	160	1986	Vaginal Hysterectomy	92	92	99	98	100	106	95	88	84	86	83
37	Prabahakar	18	M	53	1	167	2989	Appendicectomy	83	94	96	95	93	90	85	86	74	78	77
38	Marimuthu	28	M	66	1	169	3109	Appendicectomy	87	93	94	86	84	86	88	82	87	80	77
39	KalaiSelvi	18	F	58	1	156	3124	Appendicectomy	94	83	86	89	89	91	79	80	82	83	80
40	murugesan	50	M	64	1	169	3069	B/L eversion of sac	78	80	82	75	74	72	70	68	69	70	71

HEART RATE

	55 min	60min	65 min	70 min	75 min	80 min	85min	90min	95 min	100 min	110 min
1	77	100	97	88	89	85	80	81	80	82	82
2	82	88	90	92	80	78	70	74	69	70	68
3	86	98	102	86	68	70	71	72	74	66	68
4	74	72	80	76	67	66	69	67	68	70	67
5	90	88	96	88	83	84	80	82	80	78	77
6	86	88	94	92	90	80	79	78	74	76	78
7	78	76	80	82	71	72	70	70	72	73	71
8	90	95	106	97	90	88	86	85	88	82	80
9	82	86	91	89	84	80	79	80	82	76	81
10	85	98	97	94	95	90	88	86	82	86	80
11	78	82	90	88	81	82	80	75	77	74	72
12	82	84	88	88	87	89	79	79	73	74	75
13	78	82	89	86	81	82	80	75	77	74	72
14	82	84	92	87	87	89	79	79	73	74	75
15	71	79	88	82	72	74	73	70	72	76	68
16	71	79	88	82	72	74	73	70	72	76	68
17	76	79	79	78	71	70	58	59	62	64	62
18	92	92	98	100	100	106	95	88	84	86	83
19	81	100	78	104	98	88	86	84	72	70	68
20	90	96	104	100	92	88	84	86	80	82	80
21	86	100	106	104	102	92	94	90	88	78	77
22	78	80	88	79	74	72	70	68	69	70	71
23	81	94	104	92	89	85	80	81	80	82	82
24	82	84	90	88	80	78	70	74	69	70	68
25	86	98	99	96	78	70	71	72	74	66	68
26	76	82	94	86	78	74	72	70	70	72	70
27	92	106	108	93	96	94	91	90	91	92	90
28	83	85	94	82	80	81	84	80	78	81	78
29	84	100	104	100	98	88	86	84	72	70	68
30	90	96	108	104	92	88	84	86	80	82	80
31	86	100	106	104	102	92	94	90	88	78	77
32	78	80	86	78	74	72	70	68	69	70	71
33	79	94	100	92	89	85	80	81	80	82	82
34	78	76	80	72	68	66	62	58	59	62	61
35	92	88	97	94	96	97	98	82	80	83	80
36	83	96	100	94	92	80	82	78	75	74	79
37	88	92	94	84	86	83	81	80	82	83	80
38	88	82	84	80	78	73	77	73	78	75	72
39	86	88	86	87	90	80	79	78	74	76	78
40	78	76	80	82	71	72	70	70	72	73	71

DEXMEDETOMIDINE

Sl. No.	Name	Ag e	Sex	Weight	ASA	Height in cms	Ip No	Surgery	Heart rate										
									Baseline	5 min	10 min	15min	20 min	25 min	30 min	35min	40 min	45 min	50 min
41	Sakthivel	36	M	70	1	170	3313	appendicectomy	77	100	97	88	89	85	80	81	80	82	82
42	Thangavel	40	M	59	1	158	3379	L Hernioplasty	82	88	90	92	80	78	70	74	69	70	68
43	Malar	40	F	60	2	158	3591	Myomecctomy	86	98	102	86	68	70	71	72	74	66	68
44	Rani	30	F	50	2	162	3564	Ward Mayo's	74	72	80	76	67	66	69	67	68	70	67
45	Jesuraj	30	M	70	1	166	3557	Rt.Hernioplasty	90	88	96	88	83	84	80	82	80	78	77
46	Sivanantham	55	M	52	1	168	2954	B/L Hydrocoele	86	88	94	92	90	80	79	78	74	76	78
47	Iyappan	28	M	54	1	170	3588	R Hernioplasty	78	76	80	82	71	72	70	70	72	73	71
48	meghala	30	F	60	1	160	1985	Myomectomy	90	95	106	97	90	88	86	85	88	82	80
49	Ramya	25	F	48	1	156	3683	Appendicectomy	82	86	91	46	48	98	79	80	82	76	81
50	Selvam	28	M	65	1	164	3505	L Hernioplasty	85	98	97	94	95	90	88	86	82	86	80
51	ganesan	44	M	74	1	155	3267	Rt.Hernioplasty	78	82	90	88	81	82	80	75	77	74	72
52	Krishnaveni	48	F	80	1	158	1955	TAH with BSO	82	84	88	88	87	89	79	79	73	74	75
53	Pitchammal	58	F	71	1	152	1980	VH with PFR	78	82	89	86	81	82	80	75	77	74	72
54	Manimaran	22	M	62	1	172	3766	Appendicectomy	82	84	92	87	87	89	79	79	73	74	75
55	Sathya	34	F	54	1	156	3644	Onlay meshplasty	71	79	88	82	72	74	73	70	72	76	68
56	Sundar	29	M	77	1	160	8808	varicoelectomy	71	79	88	82	72	74	73	70	72	76	68
57	Mahamudha	30	F	64	2	168	1846	Hysteroscopy Guided D&C	76	79	79	78	48	52	58	59	62	64	62
58	Manish	28	M	66	1	168	8508	vesicolithotripsy	92	92	98	100	100	106	95	88	84	86	83
59	Dinesh	20	M	82	2	167	8683	Urethral diverticulectomy	81	100	78	104	98	88	86	84	72	70	68
60	Kannadasan	20	M	55	1	169	3871	R Hernioplasty	90	96	94	100	92	88	84	86	80	82	80
61	Sivaprakasam	25	M	54	1	172	3885	L Hernioplasty	86	100	106	104	102	92	94	90	88	78	77
62	Vasantha	27	F	69	1	159	1910	Rt.ovarian cystectomy	78	80	88	79	74	72	70	68	69	70	71
63	Sabarirajan	29	M	77	1	166	8705	Vesicolithotripsy	81	94	104	92	89	85	80	81	80	82	82
64	Thillairani	32	F	69	1	152	1875	Myomectomy	82	84	90	88	80	78	70	74	69	70	68
65	Parthiban	18	M	80	1	160	3469	Stage II urethroplasty	86	98	99	96	78	70	71	72	74	66	68
66	Jayakodi	56	F	53	2	159	1966	TAH with BSO	76	82	94	86	78	74	72	70	70	72	70
67	Murthy	35	M	55	1	157	3267	L Hernioplasty	92	106	108	93	96	94	91	90	91	92	90
68	Dinesh	38	M	55	2	169	3975	R Hernioplasty	83	85	94	82	80	81	84	80	78	81	78
69	Sathya	46	F	60	1	168	1847	TAH	84	86	78	47	98	88	86	84	72	70	68
70	Swaminathan	29	M	54	1	169	8969	Satge I Urethroplasty	90	96	98	104	92	88	84	86	80	82	80
71	Shantha	29	F	45	1	160	1826	Myomectomy	86	100	106	104	102	92	94	90	88	78	77
72	Venkatesan	30	M	62	1	168	8726	Ca Penis Incision Biopsy	78	80	86	78	74	72	70	68	69	70	71
73	Sivagami	25	F	59	1	158	3797	Hernioplasty	79	94	100	92	89	85	80	81	80	82	82
74	Dhanam	32	F	57	1	160	1961	Staging laprotomy	78	76	80	72	68	66	62	58	59	62	61
75	Devagi	33	F	45	1	158	3715	Hemorrhoidectomy	92	88	97	94	96	97	98	82	80	83	80
76	Shyama	38	F	54	1	155	3907	R Hernioplasty	83	96	100	94	92	80	82	78	75	74	79
77	Gomathy	30	F	50	1	156	1943	Onlay meshplasty	88	92	94	84	86	83	81	80	82	83	80
78	Kavitha	37	F	67	1	160	3477	Mesh plasty	88	82	84	80	78	73	77	73	78	75	72
79	Jayaraman	39	M	54	1	166	8941	Urethral diverticulectomy	86	88	86	87	90	80	79	78	74	76	78
80	Bhuvaneswari	29	F	58	2	155	3467	Appendicectomy	78	76	80	82	71	72	70	70	72	73	71

HEART RATE

SL NO	55 min	60min	65 min	70 min	75 min	80 min	85min	90min	95 min	100 min	110 min
41	70	74	78	86	82	77	80	86	87	84	77
42	74	81	84	84	83	86	75	77	73	67	86
43	89	82	102	102	94	96	90	94	78	72	96
44	82	84	80	75	70	65	65	63	69	60	65
45	86	82	84	83	84	68	78	76	80	74	68
46	98	96	100	104	92	90	88	86	84	84	90
47	82	88	86	78	74	72	70	70	72	70	72
48	90	88	90	86	84	88	90	92	92	90	88
49	85	89	82	80	81	84	80	78	81	78	84
50	82	52	58	68	68	76	74	82	70	72	76
51	96	98	97	92	88	84	86	80	82	80	84
52	80	88	84	92	92	94	90	88	78	77	94
53	80	82	75	74	72	70	68	69	70	71	70
54	94	97	88	89	85	80	81	80	82	82	80
55	64	66	64	68	68	60	67	69	70	68	60
56	98	96	80	68	70	71	72	74	66	68	71
57	72	70	68	67	66	69	67	68	70	67	69
58	84	85	94	103	106	96	92	90	86	87	96
59	91	84	81	88	86	84	80	81	72	74	84
60	80	70	98	94	70	73	66	69	68	63	73
61	76	75	70	68	66	62	58	59	62	61	62
62	88	93	94	96	97	98	82	80	83	80	98
63	96	95	94	92	80	82	78	75	74	79	82
64	92	94	104	106	103	91	90	82	83	80	91
65	82	84	80	78	73	77	73	78	75	72	77
66	78	86	82	90	80	79	78	74	76	78	79
67	66	64	72	71	70	68	70	72	73	71	68
68	95	98	93	90	88	86	85	88	82	80	86
69	86	85	80	84	80	79	80	82	76	81	79
70	98	97	94	95	90	88	86	82	86	80	88
71	82	83	80	81	82	80	75	77	74	72	80
72	84	86	85	87	89	79	79	73	74	75	79
73	79	82	76	72	74	73	70	72	76	68	73
74	98	102	100	96	93	86	83	80	81	80	86
75	79	80	74	71	70	58	59	62	64	62	58
76	92	99	98	100	106	95	88	84	86	83	95
77	94	96	95	93	90	85	86	74	78	77	85
78	93	94	86	84	86	88	82	87	80	77	88
79	83	86	89	89	91	79	80	82	83	80	79
80	80	82	75	74	72	70	68	69	70	71	70

MEPERIDINE

Sl. No.	Name	MAP																					
		Baseline	5 min	10min	15 min	20min	25 min	30 min	35min	40min	45 min	50 min	55 min	60 min	65 min	70 min	75 min	80 min	85 min	90 min	95 min	100min	110 min
1	Selvaraj	72	70	68	66	66	68	70	72	80	82	84	72	70	88	66	66	68	70	72	80	82	72
2	Sekar	98	72	68	66	66	64	62	62	67	70	71	68	72	68	66	66	64	62	62	67	70	68
3	Raja	84	82	80	82	82	80	76	76	80	84	89	84	82	80	82	82	80	76	76	80	84	84
4	Vasanthi	75	75	77	78	74	71	70	96	86	88	87	75	75	77	78	74	71	70	96	86	88	75
5	Kalidas	80	80	64	60	76	74	76	78	80	76	72	80	80	74	76	70	74	76	78	80	76	80
6	Mohd.iqbal	80	82	84	80	82	82	80	82	84	82	79	80	82	84	80	82	82	80	82	84	82	80
7	Dhansekar	78	74	60	56	78	80	74	76	77	77	79	78	74	70	76	78	80	74	76	77	77	78
8	Arivukarasu	80	78	76	74	78	82	76	74	76	80	86	80	78	76	74	78	82	76	74	76	80	80
9	Prakash	78	74	70	72	68	70	72	70	76	71	70	78	74	70	72	68	70	72	70	76	71	76
10	Muthu	70	68	66	68	64	68	64	70	69	70	70	70	68	66	68	64	68	64	70	69	70	70
11	Esther	78	70	56	72	68	68	62	68	67	69	70	68	70	56	72	68	68	62	68	67	69	68
12	Mariyammal	76	74	72	70	68	74	72	76	74	77	80	76	74	72	70	68	74	72	76	74	77	76
13	Kosala	72	68	64	64	62	82	68	70	77	72	79	72	68	66	70	72	70	68	70	77	72	72
14	Unnamalai	72	74	80	73	72	70	72	70	71	70	77	72	74	80	73	72	70	72	70	71	70	72
15	Pattammal	78	79	70	78	79	78	80	74	78	75	77	78	79	70	78	79	78	80	74	78	75	78
16	kumar	78	70	70	72	70	73	70	70	76	72	75	68	70	70	72	70	73	70	70	76	72	68
17	kanchana	73	68	72	68	65	82	63	64	65	66	66	68	68	72	68	65	82	63	64	65	66	68
18	Rajeswari	84	67	67	62	68	67	69	67	65	69	70	54	67	67	62	68	67	69	67	65	69	54
19	Velmurugan	88	88	72	70	73	70	78	76	74	77	71	88	88	72	70	73	70	78	76	74	77	80
20	S anthi	78	72	70	70	70	77	72	70	73	68	74	78	72	70	70	70	77	72	70	73	68	78
21	RanjIth	80	82	80	78	76	78	78	78	79	84	80	80	82	80	78	76	78	78	78	79	84	80
22	Anbukarasi	70	72	77	72	72	70	72	72	77	74	76	70	72	77	72	72	70	72	72	77	74	70
23	Karmegam	78	84	80	78	76	80	78	70	71	75	72	78	84	80	78	76	80	78	70	71	75	78
24	Suresh	70	68	72	66	66	66	64	64	68	67	71	70	68	72	66	66	66	64	64	68	67	70
25	Balachander	80	70	70	72	68	70	70	70	71	76	80	80	70	70	72	68	70	70	70	71	76	80
26	mariyaal	70	82	80	84	80	82	80	81	84	82	89	70	82	80	84	80	82	80	81	84	82	70
27	Banupriya	78	80	74	74	74	76	76	74	71	78	74	78	80	74	74	74	76	76	74	71	78	78
28	Senthilkumar	84	67	67	62	68	67	69	67	68	70	74	74	67	67	62	68	67	69	67	68	70	74
29	rathinam	78	76	76	74	74	76	74	70	72	69	79	78	76	76	74	74	76	74	70	72	69	78
30	Anjalai	82	78	80	73	76	78	76	70	82	84	86	82	78	80	73	76	78	76	70	82	84	82
31	Nagaraj	94	70	66	66	64	62	66	64	70	74	81	68	70	66	66	64	62	66	64	70	74	68
32	Devi	80	78	72	72	72	76	74	74	76	74	79	80	78	72	72	72	76	74	74	76	74	80
33	Venkatesan	82	68	56	56	76	76	74	64	68	67	69	62	68	72	66	66	66	64	64	68	67	62
34	Jeyavel	84	70	78	76	80	78	78	70	72	71	79	84	70	78	76	80	78	78	70	72	71	84
35	Sathyabama	70	72	70	68	64	66	64	64	64	69	72	70	72	70	68	64	66	64	64	64	69	70
36	Marie	80	78	76	76	76	74	74	74	78	78	76	80	78	76	76	76	74	74	74	78	78	80
37	Prabahakar	78	70	66	66	64	62	66	64	69	72	80	68	70	66	66	64	62	66	64	69	72	68
38	Marimuthu	84	70	78	76	80	78	78	70	74	76	81	84	70	78	76	80	78	78	70	74	76	74
39	KalaiSelvi	70	72	70	68	64	66	64	64	64	69	72	70	72	70	68	64	66	64	64	64	69	70
40	murugesan	72	68	66	70	72	70	68	70	77	72	79	72	68	66	70	72	70	68	70	77	72	72

DEXMEDETOMIDINE

Sl. No.	Name	MAP																				
		Baseline	5 min	10min	15 min	20min	25 min	30 min	35min	40min	45 min	50 min	55 min	60 min	65 min	70 min	75 min	80 min	85 min	90 min	95 min	100min	110 min
41	Sakthivel	82	74	80	73	72	70	72	70	71	70	77	70	74	82	73	72	70	72	70	71	70	74
42	Thangavel	96	79	70	78	79	78	80	74	78	75	77	78	79	70	78	79	78	80	74	78	75	77
43	Malar	88	70	70	72	70	73	70	70	76	72	75	68	70	70	72	70	73	70	70	76	72	75
44	Rani	88	68	72	68	65	82	63	64	65	68	76	78	78	72	73	75	82	73	74	75	76	76
45	Jesuraj	74	67	67	62	68	77	79	67	75	69	70	74	67	67	62	68	67	69	67	65	69	70
46	Sivanantham	88	88	72	70	73	70	78	76	74	77	71	88	88	72	70	73	70	78	76	74	77	71
47	Iyappan	90	72	70	70	70	77	72	70	73	68	74	78	72	70	70	70	77	72	70	73	68	74
48	meghala	78	80	74	74	74	76	76	74	71	78	74	78	80	74	74	74	76	76	74	71	78	72
49	Ramya	88	72	70	58	58	78	79	67	68	70	74	73	67	67	62	68	67	69	67	68	70	74
50	Selvam	90	76	76	74	74	76	74	70	72	69	79	78	76	76	74	74	76	74	70	72	69	79
51	ganesan	82	78	80	73	76	78	76	70	82	84	86	82	78	80	73	76	78	76	70	82	84	76
52	Krishnaveni	78	70	66	66	64	62	58	79	78	76	76	74	74	76	66	64	62	66	64	70	74	81
53	Pitchammal	80	78	72	72	72	76	74	74	76	74	79	80	78	72	72	72	76	74	74	76	74	72
54	Manimaran	82	68	72	66	66	66	64	64	68	67	69	62	68	72	66	66	66	64	64	68	67	69
55	Sathya	84	70	78	76	80	78	78	70	72	71	79	84	70	78	76	80	78	78	70	72	71	79
56	Sundar	84	70	78	76	80	78	78	70	72	71	79	84	70	78	76	80	78	78	70	72	71	74
57	Mahamudha	108	74	70	76	78	80	74	76	77	77	79	78	74	70	76	78	80	74	76	77	77	79
58	Manish	85	78	76	74	78	82	76	74	76	80	86	80	78	76	74	78	82	76	74	76	80	70
59	Dinesh	98	74	70	72	68	70	72	70	76	71	70	78	74	70	72	68	70	72	70	76	71	70
60	Kannadasan	92	68	72	66	66	66	64	64	68	67	69	62	68	72	66	66	66	64	64	68	67	69
61	Sivaprakasam	84	70	78	76	80	78	78	70	72	71	79	84	70	78	76	80	78	78	70	72	71	79
62	Vasantha	106	72	70	68	64	66	64	64	64	69	72	70	72	70	78	74	76	74	77	84	79	72
63	Sabarirajan	80	78	76	76	76	74	74	74	78	78	76	80	78	76	76	76	74	74	74	78	78	76
64	Thillairani	78	70	66	66	64	62	66	64	69	72	80	68	70	66	66	64	62	66	64	69	72	80
65	Parthiban	72	70	68	66	66	68	70	72	80	82	84	72	70	68	66	66	68	70	72	80	82	80
66	Jayakodi	78	72	70	70	70	77	72	70	73	68	74	78	72	70	70	70	77	72	70	73	68	74
67	Murthy	80	82	80	78	76	78	78	78	79	84	80	80	82	80	78	76	78	78	78	79	84	80
68	Dinesh	90	72	77	72	72	70	72	72	77	74	76	70	72	77	72	72	70	72	72	77	74	76
69	Sathya	78	84	80	78	76	80	78	70	71	75	72	78	84	80	78	76	80	78	70	71	75	72
70	Swaminathan	80	68	72	66	66	66	64	64	68	67	71	70	68	72	66	66	76	74	73	78	77	71
71	Shantha	80	70	70	72	68	70	70	70	71	76	80	80	70	70	72	68	70	70	70	71	76	72
72	Venkatesan	70	82	80	84	80	82	80	81	84	82	89	70	82	80	84	80	82	80	81	84	82	80
73	Sivagami	97	80	74	74	74	76	76	74	71	78	74	78	80	74	74	74	76	76	74	71	78	74
74	Dhanam	88	70	66	66	64	62	66	64	69	72	80	68	70	66	66	64	62	66	64	69	72	80
75	Devagi	72	70	68	66	66	68	70	72	80	82	84	72	70	68	66	66	68	70	72	80	82	84
76	Shyama	98	72	68	66	66	64	62	62	67	70	71	68	72	68	66	66	64	62	62	67	70	71
77	Gomathy	84	82	80	82	82	80	76	76	80	84	89	84	82	80	82	82	80	76	76	80	84	79
78	Kavitha	75	75	77	78	74	71	70	96	86	88	87	75	75	77	78	74	71	70	96	86	88	77
79	Jayaraman	84	70	78	76	80	78	78	70	74	76	81	84	70	78	76	80	78	78	70	74	76	81
80	Bhuvaneswari	70	72	70	68	64	66	64	64	64	69	72	70	72	70	68	64	66	64	64	64	69	72

MEPERIDINE

Sl. No.	Name	TEMPERATURE																				
		Baseline	5 min	10min	15 min	20min	25 min	30 min	35min	40min	45 min	50 min	55 min	60 min	65 min	70 min	75 min	80 min	85 min	90 min	95 min	100min
1	Raguvaran	36.3	35.9	35.9	36	36	36.1	36	36	36	36	36	36.3	35.9	35.9	36	36	36.1	36	36	36	36
2	Sekar	36	35.9	35.8	35.9	36	36	36.1	36.1	36.1	36	36	36	35.9	35.8	35.9	36	36	36.1	36.1	36.1	36
3	Devadoss	36.8	35.7	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.8	35.7	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9
4	Raja	36.4	36.3	36.2	36.2	36.2	36.2	36.2	36.2	36.2	36.2	36.3	36.4	36.3	36.2	36.2	36.2	36.2	36.2	36.2	36.2	36.2
5	Vijaya	36.2	35.8	35.9	36.1	36.1	36.2	36.2	36.1	36.1	36.2	36.2	36.2	35.8	35.9	36.1	36.1	36.2	36.2	36.1	36.1	36.2
6	Sahul ahamed	36.3	35.9	35.9	36	36	36.1	36	36	36	36	36	36.3	35.9	35.9	36	36	36.1	36	36	36	36
7	Chandrasekaran	36	35.9	35.8	35.9	36	36	36.1	36.1	36.1	36	36	36	35.9	35.8	35.9	36	36	36.1	36.1	36.1	36
8	Arivazhagan	36.0	35.7	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.8	35.7	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9
9	Prakash	36.4	36.3	36.2	36.2	36.2	36.2	36.2	36.2	36.2	36.2	36.3	36.4	36.3	36.2	36.2	36.2	36.2	36.2	36.2	36.2	36.2
10	Muthu	36.3	35.9	35.8	35.8	35.9	35.9	36	36	36	36	36	36.3	35.9	35.8	35.8	35.9	35.9	36	36	36	36
11	Marimuthu	36.2	36.1	36.1	36.2	36.2	36.3	36.3	36.3	36.3	36.2	36.3	36.2	36.1	36.1	36.2	36.2	36.3	36.3	36.3	36.3	36.2
12	Kaliaperumal	36.1	36	36	36	35.9	36.2	36.1	36.1	36.1	36.1	36	36.1	36	36	36	35.9	36.2	36.1	36.1	36.1	36.1
13	Jayanthi	36.9	35.7	35.8	35.9	35.9	35.9	35.9	35.8	35.8	35.8	35.8	35.9	35.7	35.8	35.9	35.9	35.9	35.9	35.8	35.8	35.8
14	Govindan	36	35.9	35.8	36	36	36	36	36	36	36	36	36	35.9	35.8	36	36	36	36	36	36	36
15	Manikandan	36.1	35.9	35.8	35.8	35.9	35.9	35.9	35.9	35.9	36	36	36.1	35.9	35.8	35.8	35.9	35.9	35.9	35.9	35.9	36
16	kumar	36.8	35.7	35.7	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.7	35.7	35.8	35.8	35.8	35.8	35.8	35.8	35.8
17	kanchana	36.2	36	36	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.2	36	36	36.1	36.1	36.1	36.1	36.1	36.1	36.1
18	Rajeswari	36.1	35.9	35.8	35.9	36	36	36.1	36.1	36.1	36	36	36.1	35.9	35.8	35.9	36	36	36.1	36.1	36.1	36
19	Velmurugan	35.8	35.7	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.8	35.7	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9
20	Santhi	36.3	36.3	36.2	36.2	36.2	36.2	36.2	36.2	36.2	36.2	36.3	36.3	36.3	36.2	36.2	36.2	36.2	36.2	36.2	36.2	36.2
21	RanjIth	36.4	35.9	35.8	35.8	35.9	35.9	36	36	36	36	36	36.4	35.9	35.8	35.8	35.9	35.9	36	36	36	36
22	Anbukarasi	36.3	36.1	36.1	36.2	36.2	36.3	36.3	36.3	36.3	36.2	36.3	36.3	36.1	36.1	36.2	36.2	36.3	36.3	36.3	36.3	36.2
23	Karmegam	36.1	36	36	36	35.9	36.2	36.1	36.1	36.1	36.1	36	36.1	36	36	36	35.9	36.2	36.1	36.1	36.1	36.1
24	Suresh	36	35.9	35.8	36	36	36	36	36	36	36	36	36	35.9	35.8	36	36	36	36	36	36	36
25	Balachander	36.1	35.9	35.8	35.8	35.9	35.9	35.9	35.9	35.9	36	36	36.1	35.9	35.8	35.8	35.9	35.9	35.9	35.9	35.9	36
26	mariyaal	36.8	35.7	35.7	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.7	35.7	35.8	35.8	35.8	35.8	35.8	35.8	35.8
27	Banupriya	36.2	36	36	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.2	36	36	36.1	36.1	36.1	36.1	36.1	36.1	36.1
28	Senthilkumar	36.1	35.9	35.8	35.9	36	36	36.1	36.1	36.1	36	36	36.1	35.9	35.8	35.9	36	36	36.1	36.1	36.1	36
29	rathinam	37.0	35.7	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.8	35.7	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9
30	Anjalai	36.1	35.9	35.8	35.8	35.9	35.9	35.9	35.9	35.9	36	36	36.1	35.9	35.8	35.8	35.9	35.9	35.9	35.9	35.9	36
31	Nagaraj	36.8	35.7	35.7	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.7	35.7	35.8	35.8	35.8	35.8	35.8	35.8	35.8
32	Devi	36.2	36	36	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.2	36	36	36.1	36.1	36.1	36.1	36.1	36.1	36.1
33	Venkatesan	36.1	35.9	35.8	35.9	36	36	36.1	36.1	36.1	36	36	36.1	35.9	35.8	35.9	36	36	36.1	36.1	36.1	36
34	Jeyavel	36.0	35.7	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.8	35.7	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9
35	Sathyabama	36.3	36.3	36.2	36.2	36.2	36.2	36.2	36.2	36.2	36.2	36.3	36.3	36.3	36.2	36.2	36.2	36.2	36.2	36.2	36.2	36.2
36	Marie	36.1	35.9	35.8	35.9	36	36	36.1	36.1	36.1	36	36	36.1	35.9	35.8	35.9	36	36	36.1	36.1	36.1	36
37	Prabahakar	36.8	35.7	35.7	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.7	35.7	35.8	35.8	35.8	35.8	35.8	35.8	35.8
38	Marimuthu	36.3	35.9	35.8	35.8	35.9	35.9	36	36	36	36	36	36.3	35.9	35.8	35.8	35.9	35.9	36	36	36	36
39	KalaiSelvi	36.2	36.1	36.1	36.2	36.2	36.3	36.3	36.3	36.3	36.2	36.3	36.2	36.1	36.1	36.2	36.2	36.3	36.3	36.3	36.3	36.2
40	murugesan	36.1	35.9	35.8	35.9	36	36	36.1	36.1	36.1	36	36	36.1	35.9	35.8	35.9	36	36	36.1	36.1	36.1	36

DEXMEDETOMIDINE

Sl. No.	Name	Temperature																				
		Baseline	5 min	10min	15 min	20min	25 min	30 min	35min	40min	45 min	50 min	55 min	60 min	65 min	70 min	75 min	80 min	85 min	90 min	95 min	100min	110 min
41	Sakthivel	36.2	36	36	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.2	36	36	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.1
42	Thangavel	36.1	35.9	35.8	35.9	36	36	36.1	36.1	36.1	36	36	36.1	35.9	35.8	35.9	36	36	36.1	36.1	36.1	36	36
43	Malar	36.0	35.7	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.8	35.7	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9
44	Rani	36.3	36.3	36.2	36.2	36.2	36.2	36.2	36.2	36.2	36.2	36.3	36.3	36.3	36.2	36.2	36.2	36.2	36.2	36.2	36.2	36.2	36.3
45	Jesuraj	36.4	35.9	35.8	35.8	35.9	35.9	36	36	36	36	36	36.4	35.9	35.8	35.8	35.9	35.9	36	36	36	36	36
46	Sivanantham	36.3	36.1	36.1	36.2	36.2	36.3	36.3	36.3	36.3	36.2	36.3	36.3	36.1	36.1	36.2	36.2	36.3	36.3	36.3	36.3	36.2	36.3
47	Iyappan	36.5	36	36	36	35.9	36.2	36.1	36.1	36.1	36.1	36	36	36	36	36	35.9	36.2	36.1	36.1	36.1	36.1	36
48	meghala	36.1	35.9	35.8	36	36	36	36	36	36	36	36	36.1	35.9	35.8	36	36	36	36	36	36	36	36
49	Ramya	36.1	35.9	35.8	35.8	35.9	35.9	35.9	35.9	35.9	36	36	36.1	35.9	35.8	35.8	35.9	35.9	35.9	35.9	35.9	36	36
50	Selvam	36.7	35.7	35.7	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.7	35.7	35.7	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8
51	ganesan	36.2	36	36	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.2	36	36	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.1
52	Krishnaveni	36.2	35.9	35.8	35.9	36	36	36.1	36.1	36.1	36	36	36.2	35.9	35.8	35.9	36	36	36.1	36.1	36.1	36	36
53	Pitchammal	36.4	35.7	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.8	35.7	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9
54	Manimaran	36.1	35.9	35.8	35.8	35.9	35.9	35.9	35.9	35.9	36	36	36.1	35.9	35.8	35.8	35.9	35.9	35.9	35.9	35.9	36	36
55	Sathya	36.8	35.7	35.7	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.7	35.7	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8
56	Sundar	36.1	36	36	36	35.9	36.2	36.1	36.1	36.1	36.1	36	36.1	36	36	36	35.9	36.2	36.1	36.1	36.1	36.1	36
57	Mahamudha	36.2	35.9	35.8	36	36	36	36	36	36	36	36	36.2	35.9	35.8	36	36	36	36	36	36	36	36
58	Manish	36.1	35.9	35.8	35.8	35.9	35.9	35.9	35.9	35.9	36	36	36.1	35.9	35.8	35.8	35.9	35.9	35.9	35.9	35.9	36	36
59	Dinesh	36.0	35.7	35.7	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.7	35.7	35.7	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8
60	Kannadasan	36.3	36	36	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.3	36	36	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.1
61	Sivaprakasam	36.3	36	36	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.3	36	36	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.1
62	Vasantha	36.7	35.7	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.7	35.7	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9
63	Sabarirajan	36.1	35.9	35.8	35.8	35.9	35.9	35.9	35.9	35.9	36	36	36.1	35.9	35.8	35.8	35.9	35.9	35.9	35.9	35.9	36	36
64	Thillairani	36.7	35.7	35.7	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.7	35.7	35.7	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8
65	Parthiban	36.2	36	36	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.2	36	36	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.1
66	Jayakodi	36.2	35.9	35.8	35.9	36	36	36.1	36.1	36.1	36	36	36.2	35.9	35.8	35.9	36	36	36.1	36.1	36.1	36	36
67	Murthy	36.8	35.7	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.8	35.7	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9
68	Dinesh	36.3	36.3	36.2	36.2	36.2	36.2	36.2	36.2	36.2	36.2	36.3	36.3	36.3	36.2	36.2	36.2	36.2	36.2	36.2	36.2	36.2	36.3
69	Sathya	36.1	35.9	35.8	35.9	36	36	36.1	36.1	36.1	36	36	36.1	35.9	35.8	35.9	36	36	36.1	36.1	36.1	36	36
70	Swaminathan	36.2	35.8	35.9	36.1	36.1	36.2	36.2	36.1	36.1	36.2	36.2	36.2	35.8	35.9	36.1	36.1	36.2	36.2	36.1	36.1	36.2	36.2
71	Shantha	36.3	35.9	35.9	36	36	36.1	36	36	36	36	36	36.3	35.9	35.9	36	36	36.1	36	36	36	36	36
72	Venkatesan	36.2	35.9	35.8	35.9	36	36	36.1	36.1	36.1	36	36	36.2	35.9	35.8	35.9	36	36	36.1	36.1	36.1	36	36
73	Sivagami	36.8	35.7	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.8	35.7	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9
74	Dhanam	36.4	36.3	36.2	36.2	36.2	36.2	36.2	36.2	36.2	36.2	36.3	36.4	36.3	36.2	36.2	36.2	36.2	36.2	36.2	36.2	36.2	36.3
75	Devagi	36.3	35.9	35.8	35.8	35.9	35.9	36	36	36	36	36	36.3	35.9	35.8	35.8	35.9	35.9	36	36	36	36	36
76	Shyama	36.2	36.1	36.1	36.2	36.2	36.3	36.3	36.3	36.3	36.2	36.3	36.2	36.1	36.1	36.2	36.2	36.3	36.3	36.3	36.3	36.2	36.3
77	Gomathy	36.1	36	36	36	35.9	36.2	36.1	36.1	36.1	36.1	36	36.1	36	36	36	35.9	36.2	36.1	36.1	36.1	36.1	36
78	Kavitha	36.9	35.7	35.8	35.9	35.9	35.9	35.9	35.8	35.8	35.8	35.8	35.9	35.7	35.8	35.9	35.9	35.9	35.9	35.8	35.8	35.8	35.8
79	Jayaraman	36.1	35.9	35.8	36	36	36	36	36	36	36	36	36.1	35.9	35.8	36	36	36	36	36	36	36	36
80	Bhuvaneswari	36.4	35.9	35.8	35.8	35.9	35.9	35.9	35.9	35.9	36	36	36	35.9	35.8	35.8	35.9	35.9	35.9	35.9	35.9	36	36

MEPERIDINE

Sl. No.	Name	Shivering grade																			
		Baseline	5 min	10min	15 min	20min	25 min	30 min	35min	40min	45 min	50 min	55 min	60 min	65 min	70 min	75 min	80 min	85 min	90 min	95 min	100min
1	Raguvaran	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	Sekar	0	0	0	2	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	Devadoss	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	Raja	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	Vijaya	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	Sahul ahamed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	Chandrasekaran	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	Arivazhagan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	Prakash	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	Muthu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	Marimuthu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	Kaliaperumal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	Jayanthi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	Govindan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	Manikandan	0	0	0	0	0	0	0	0	3	3	2	2	2	0	0	0	0	0	0	0	0
16	kumar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	kanchana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	Rajeswari	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	Velmurugan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	Santhi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	RanjIth	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	Anbukarasi	0	0	0	0	0	2	2	3	3	0	0	0	0	0	0	0	0	0	0	0	0
23	Karmegam	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	Suresh	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	Balachander	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	mariyaal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	Banupriya	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	Senthilkumar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	rathinam	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	Anjalai	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	Nagaraj	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
32	Devi	0	0	0	0	0	0	3	3	2	2	2	0	0	0	0	0	0	0	0	0	0
33	Venkatesan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
34	Jeyavel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
35	Sathyabama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
36	Marie	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
37	Prabahakar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
38	Marimuthu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
39	KalaiSelvi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40	murugesan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

DEXMEDETOMIDINE

Sl. No.	Name	Shivering grade																			
		Baseline	5 min	10min	15 min	20min	25 min	30 min	35min	40min	45 min	50 min	55 min	60 min	65 min	70 min	75 min	80 min	85 min	90 min	95 min	100min
41	Sakthivel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
42	Thangavel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
43	Malar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
44	Rani	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
45	Jesuraj	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
46	Sivanantham	0	0	0	0	0	0	2	3	3	0	0	0	0	0	0	0	0	0	0	0	0
47	Iyappan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
48	meghala	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
49	Ramya	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50	Selvam	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
51	ganesan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
52	Krishnaveni	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
53	Pitchammal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
54	Manimaran	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
55	Sathya	0	0	0	0	3	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
56	Sundar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
57	Mahamudha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
58	Manish	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
59	Dinesh	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60	Kannadasan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61	Sivaprakasam	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
62	Vasantha	0	0	0	0	0	2	3	3	2	0	0	0	0	0	0	0	0	0	0	0	0
63	Sabarirajan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
64	Thillairani	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
65	Parthiban	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
66	Jayakodi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
67	Murthy	0	0	0	0	o	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
68	Dinesh	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
69	Sathya	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70	Swaminathan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
71	Shantha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
72	Venkatesan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
73	Sivagami	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
74	Dhanam	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
75	Devagi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
76	Shyama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
77	Gomathy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
78	Kavitha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
79	Jayaraman	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80	Bhuvaneswari	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

MEPERIDINE

Sl. No.	Name-	Sedation score												Nausea/ Vomiting
		Pre- op	10min	20 min	30 min	40 min	50 min	60min	70 min	80 min	90 min	100 min	110 min	
1	Selvaraj	0	2	2	2	2	2	2	2	2	2	2	2	
2	Sekar	0	2	2	2	2	2	2	2	2	2	2	2	+
3	Raja	0	2	2	2	2	2	2	2	2	2	2	2	
4	Vasanthi	0	2	2	2	2	2	2	2	2	2	2	2	
5	kalidas	0	2	2	2	2	2	2	2	2	2	2	2	
6	Mohd.iqbal	0	2	2	2	2	2	2	2	2	2	2	2	+
7	Dhanasekar	0	2	2	2	2	2	2	2	2	2	2	2	
8	Arivukarasu	0	2	2	2	2	2	2	2	2	2	2	2	
9	Prakash	0	2	2	2	2	2	2	2	2	2	2	2	
10	Muthu	0	2	2	2	2	2	2	2	2	2	2	2	+
11	Esther	0	2	2	2	2	2	2	2	2	2	2	2	
12	Mariyammal	0	2	2	2	2	2	2	2	2	2	2	2	
13	Kosala	0	2	2	2	2	2	2	2	2	2	2	2	
14	Unnamalai	0	2	2	2	2	2	2	2	2	2	2	2	
15	Pattammal	0	2	2	2	2	2	2	2	2	2	2	2	
16	Kumar	0	2	2	2	2	2	2	2	2	2	2	2	
17	Kanchana	0	2	2	2	2	2	2	2	2	2	2	2	
18	Rajeswari	0	2	2	2	2	2	2	2	2	2	2	2	
19	Velmurugan	0	2	2	2	2	2	2	2	2	2	2	2	
20	S anthi	0	2	2	2	2	2	2	2	2	2	2	2	
21	RanjIth	0	2	2	2	2	2	2	2	2	2	2	2	+
22	Anbukarasi	0	2	2	2	2	2	2	2	2	2	2	2	
23	Karmegam	0	2	2	2	2	2	2	2	2	2	2	2	
24	Suresh	0	2	2	2	2	2	2	2	2	2	2	2	
25	Balachander	0	2	2	2	2	2	2	2	2	2	2	2	
26	mariyaal	0	2	2	2	2	2	2	2	2	2	2	2	
27	Banupriya	0	2	2	2	2	2	2	2	2	2	2	2	
28	Senthilkumar	0	2	2	2	2	2	2	2	2	2	2	2	+
29	rathinam	0	2	2	2	2	2	2	2	2	2	2	2	
30	Anjalai	0	2	2	2	2	2	2	2	2	2	2	2	
31	Nagaraj	0	2	2	2	2	2	2	2	2	2	2	2	
32	Devi	0	2	2	2	2	2	2	2	2	2	2	2	
33	Venkatesan	0	2	2	2	2	2	2	2	2	2	2	2	
34	Jeyavel	0	2	2	2	2	2	2	2	2	2	2	2	
35	Sathyabama	0	2	2	2	2	2	2	2	2	2	2	2	+
36	Marie	0	2	2	2	2	2	2	2	2	2	2	2	
37	Prabahakar	0	2	2	2	2	2	2	2	2	2	2	2	
38	Marimuthu	0	2	2	2	2	2	2	2	2	2	2	2	
39	KalaiSelvi	0	2	2	2	2	2	2	2	2	2	2	2	
40	murugesan	0	2	2	2	2	2	2	2	2	2	2	2	

DEXMEDETOMIDINE

	Name	Sedation score												Nausea/ Vomiting
		Pre- op	10min	20 min	30 min	40 min	50 min	60min	70 min	80 min	90 min	100min	110min	
41	Sakthivel	0	2	2	2	3	3	3	3	3	3	3	3	
42	Thangavel	0	2	3	3	3	3	3	3	3	3	3	3	
43	Malar	0	2	3	3	3	3	3	3	3	3	3	2	
44	Rani	0	2	3	3	3	3	3	3	3	3	3	2	
45	Jesuraj	0	2	3	3	3	3	3	3	3	3	3	3	
46	Sivanantham	0	2	3	3	3	3	3	3	3	3	3	2	
47	Iyappan	0	2	3	3	3	3	3	3	3	3	3	2	
48	meghala	0	2	3	3	3	3	3	3	3	3	3	2	
49	Ramya	0	2	3	3	3	3	3	3	3	3	3	2	
50	Selvam	0	2	3	3	3	3	3	2	2	3	3	2	+
51	ganesan	0	2	3	3	3	3	3	3	3	3	3	2	
52	Krishnaveni	0	2	3	3	3	3	3	3	3	3	3	2	
53	Pitchammal	0	2	3	3	3	3	3	3	3	3	3	2	
54	Manimaran	0	2	3	3	3	3	3	3	3	3	3	2	
55	Sathya	0	2	3	3	3	3	3	3	3	3	3	3	
56	Sundar	0	2	3	3	3	3	3	3	3	3	3	2	
57	Mahamudha	0	2	3	3	3	3	3	3	3	3	3	2	
58	Manish	0	2	3	3	3	3	3	2	2	2	2	2	
59	Dinesh	0	2	3	3	3	3	3	3	3	3	3	2	
60	Kannadasan	0	2	3	3	3	3	3	3	3	3	3	2	+
61	Sivaprakasam	0	2	3	3	3	3	3	3	3	3	3	2	
62	Vasantha	0	2	3	3	3	3	3	3	3	3	3	2	
63	Sabarirajan	0	2	3	3	3	3	3	3	3	3	3	3	
64	Thillairani	0	2	3	3	3	3	3	3	3	3	3	2	
65	Parthiban	0	2	3	3	3	3	3	3	3	3	3	2	
66	Jayakodi	0	2	3	3	3	3	3	3	3	3	3	2	
67	Murthy	0	2	3	3	3	3	3	3	3	3	3	3	
68	Dinesh	0	2	3	3	3	3	3	3	3	3	3	2	
69	Sathya	0	2	3	3	3	3	2	2	2	2	2	2	
70	Swaminathan	0	2	3	3	3	3	3	3	3	3	3	2	
71	Shantha	0	2	3	3	3	3	3	3	3	3	3	2	
72	Venkatesan	0	2	3	3	3	3	3	3	3	3	3	2	
73	Sivagami	0	2	3	3	3	3	3	3	3	3	3	2	
74	Dhanam	0	2	3	3	3	3	3	3	3	3	3	2	
75	Devagi	0	2	3	3	3	3	3	3	3	3	3	2	
76	Shyama	0	2	3	3	3	3	3	3	3	3	3	2	
77	Gomathy	0	2	3	3	3	3	3	3	3	3	3	2	
78	Kavitha	0	2	3	3	3	3	3	3	3	3	3	2	
79	Jayaraman	0	2	3	3	3	3	3	3	3	3	3	2	
80	Bhuvaneswari	0	2	3	3	3	3	3	3	3	3	3	2	

MEPERIDINE

Sl. No.	Name-	RESPIRATORY RATE											
		Pre- op	10min	20 min	30 min	40 min	50 min	60min	70 min	80 min	90 min	100 min	110 min
1	Selvaraj	14	14	14	14	14	14	13	13	13	14	14	14
2	Sekar	13	13	13	13	13	13	13	13	13	13	13	13
3	Raja	12	12	12	12	12	12	12	12	12	12	12	12
4	Vasanthi	13	13	13	13	13	11	10	10	12	13	13	13
5	kalidas	14	14	14	14	14	14	14	14	14	14	14	14
6	Mohd.iqbal	14	14	14	14	13	14	12	14	14	14	14	14
7	Dhanasekar	14	14	14	14	11	14	14	14	14	14	14	14
8	Arivukarasu	12	12	12	12	12	12	12	12	12	12	12	12
9	Prakash	13	13	13	12	12	11	13	13	13	13	13	13
10	Muthu	14	14	14	13	14	14	14	14	14	14	13	14
11	Esther	12	12	12	12	12	12	12	12	12	12	12	12
12	Mariyammal	13	13	13	13	13	13	13	13	13	13	13	13
13	Kosala	14	14	14	14	13	13	13	14	14	14	13	14
14	Unnamalai	12	12	12	12	12	12	12	12	12	12	12	12
15	Pattammal	12	12	12	12	12	12	12	12	12	12	12	12
16	Kumar	12	12	12	12	12	12	12	12	12	12	12	12
17	Kanchana	12	12	12	12	12	12	12	12	12	12	12	12
18	Rajeswari	12	12	12	12	12	12	12	12	12	12	12	12
19	Velmurugan	12	12	12	12	12	12	12	12	12	12	12	12
20	S anthi	14	14	13	13	10	12	13	14	13	14	14	14
21	RanjIth	13	13	13	13	13	13	12	13	13	13	13	13
22	Anbukarasi	13	13	13	13	13	12	13	13	13	13	13	13
23	Karmegam	12	12	12	12	12	12	12	12	12	12	12	12
24	Suresh	14	14	14	14	14	11	11	12	12	13	13	14
25	Balachander	13	13	13	13	12	13	13	12	13	13	13	13
26	mariyaal	12	12	12	12	12	12	12	12	12	12	12	12
27	Banupriya	13	13	13	13	13	13	13	13	13	13	13	13
28	Senthilkumar	14	14	14	12	10	10	11	10	12	12	14	14
29	rathinam	12	12	12	12	12	12	12	12	12	12	12	12
30	Anjalai	12	12	12	12	12	12	12	12	12	12	12	12
31	Nagaraj	12	12	12	12	12	12	12	12	12	12	12	12
32	Devi	12	12	12	12	12	12	12	12	12	12	12	12
33	Venkatesan	13	13	13	13	13	13	13	13	13	13	13	13
34	Jeyavel	12	12	12	12	12	12	12	12	12	12	12	12
35	Sathyabama	12	12	12	12	12	12	12	12	12	12	12	12
36	Marie	12	12	12	12	12	12	12	12	12	12	12	12
37	Prabahakar	14	14	14	14	14	14	14	14	14	14	14	14
38	Marimuthu	12	12	12	12	12	12	12	12	12	12	12	12
39	KalaiSelvi	13	13	13	13	13	13	13	13	13	13	13	13
40	murugesan	12	12	12	12	12	12	12	12	12	12	12	12

DEXMEDETOMIDINE

Sl. No.	Name	RESPIRATORY RATE											
		Pre- op	10min	20 min	30 min	40 min	50 min	60min	70 min	80 min	90 min	100 min	110 min
41	Sakthivel	12	12	12	12	12	12	12	12	12	12	12	12
42	Thangavel	12	12	12	12	12	12	12	12	12	12	12	12
43	Malar	12	12	12	12	12	12	12	12	12	12	12	12
44	Rani	14	14	14	13	14	14	14	13	14	14	14	14
45	Jesuraj	12	12	12	12	12	12	12	12	12	12	12	12
46	Sivanantham	12	12	12	12	12	12	12	12	12	12	12	12
47	Iyappan	14	14	13	14	14	14	14	14	14	14	14	14
48	meghala	12	12	12	12	12	12	12	12	12	12	12	12
49	Ramya	12	12	12	12	12	12	12	12	12	12	12	12
50	Selvam	13	13	13	13	14	13	13	14	13	13	13	13
51	ganesan	12	12	12	12	12	12	12	12	12	12	12	12
52	Krishnaveni	12	12	12	12	12	12	12	12	12	12	12	12
53	Pitchammal	12	12	12	12	12	12	12	12	12	12	12	12
54	Manimaran	12	12	12	12	12	12	12	12	12	12	12	12
55	Sathya	12	12	12	12	12	12	12	12	12	12	12	12
56	Sundar	13	12	13	13	13	13	13	13	13	13	13	13
57	Mahamudha	12	12	12	12	12	12	12	12	12	12	12	12
58	Manish	12	12	12	12	12	12	12	12	12	12	12	12
59	Dinesh	12	12	12	12	12	12	12	12	12	12	12	12
60	Kannadasan	14	12	12	12	12	12	12	12	12	12	12	12
61	Sivaprakasam	13	12	12	12	12	12	12	12	12	12	12	12
62	Vasantha	12	12	12	12	12	12	12	12	12	12	12	12
63	Sabarirajan	12	12	12	12	12	12	12	12	12	12	12	12
64	Thillairani	14	12	12	12	12	12	12	12	12	12	12	12
65	Parthiban	13	12	12	12	12	12	12	12	12	12	12	12
66	Jayakodi	12	12	12	12	12	12	12	12	12	12	12	12
67	Murthy	13	12	12	12	12	12	12	12	12	12	12	12
68	Dinesh	14	14	14	14	14	14	14	14	14	13	14	14
69	Sathya	12	12	12	12	12	12	12	12	12	12	12	12
70	Swaminathan	12	12	12	12	12	12	12	12	12	12	12	12
71	Shantha	12	12	12	12	12	12	12	12	12	12	12	12
72	Venkatesan	14	12	12	12	12	12	12	12	12	12	12	12
73	Sivagami	14	12	12	12	12	12	12	12	12	12	12	12
74	Dhanam	12	12	12	12	12	12	12	12	12	12	12	12
75	Devagi	12	12	12	12	12	12	12	12	12	12	12	12
76	Shyama	14	12	14	14	14	14	13	12	14	14	14	14
77	Gomathy	12	12	12	12	12	12	12	12	12	12	12	12
78	Kavitha	12	12	12	12	12	12	12	12	12	12	12	12
79	Jayaraman	12	12	12	12	12	12	12	12	12	12	12	12
80	Bhuvaneswari	12	12	12	12	12	12	12	12	12	12	12	12

MEPERIDINE

Sl. No.	Name	Spo2																					
		Baseline	5min	10 min	15 min	20 min	25 min	30min	35 min	40 min	45 min	50 min	55 min	60 min	65 min	70 min	75 min	80 min	85 min	90 min	95 min	100 min	110min
1	Selvaraj	100	100	99	98	100	100	99	100	100	99	99	99	99	100	99	99	99	100	100	100	100	100
2	Sekar	100	100	100	99	100	100	100	100	100	100	100	100	100	99	99	100	99	100	100	100	100	100
3	Raja	100	100	99	100	100	-	-	100	100	100	100	100	100	100	99	99	99	100	100	100	100	100
4	Vasanthi	100	100	100	99	100	100	100	100	100	100	100	100	100	100	99	100	99	100	100	100	100	100
5	kalidas	100	100	100	100	100	100	100	100	100	100	100	100	100	99	100	100	100	100	100	100	100	100
6	Mohd.iqbal	100	100	-	99	100	100	100	100	100	100	100	100	100	99	99	100	100	100	100	100	100	100
7	Dhanasekar	100	100	100	99	-	100	100	100	100	100	100	100	100	99	99	100	100	100	100	100	-	100
8	Arivukarasu	100	100	100	99	100	100	100	100	100	100	100	100	100	99	99	99	100	100	100	100	100	100
9	Prakash	100	100	100	100	-	100	100	100	100	100	100	100	100	96	98	99	100	98	100	100	100	99
10	Muthu	100	100	100	99	100	100	100	100	100	100	100	100	100	100	99	98	100	100	100	-	100	100
11	Esther	100	100	100	99	100	100	100	100	100	100	100	100	99	99	99	99	100	98	100	100	100	100
12	Mariyammal	100	100	100	99	100	100	100	100	100	99	99	100	99	99	99	100	100	98	100	100	100	98
13	Kosala	100	100	100	100	99	100	100	100	100	100	100	100	100	99	97	100	100	98	100	100	-	100
14	Unnamalai	100	100	100	98	98	98	98	98	98	100	100	100	-	98	99	100	100	100	100	100	100	100
15	Pattammal	100	100	100	98	99	100	100	100	100	100	100	100	100	99	99	100	100	99	100	100	100	100
16	Kumar	100	100	100	99	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
17	Kanchana	100	100	100	99	99	100	100	100	100	99	99	100	100	100	100	100	97	99	100	100	100	100
18	Rajeswari	100	100	100	100	99	100	100	100	100	100	100	100	100	99	-	100	100	99	100	100	100	100
19	Velmurugan	99	100	100	98	99	100	100	100	100	100	100	100	100	99	100	99	99	99	100	100	100	99
20	S anthi	100	100	100	98	99	100	100	100	100	99	99	100	100	99	100	99	98	100	100	-	100	100
21	RanjIth	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	99	100	100	100	100	100
22	Anbukarasi	100	100	100	100	100	100	100	100	100	100	-	100	100	100	100	100	100	100	100	-	100	100
23	Karmegam	100	100	100	100	100	100	-	-	100	100	100	100	100	-	100	100	99	100	100	100	100	100
24	Suresh	100	100	100	100	100	100	100	100	100	99	99	100	100	100	100	99	100	100	100	100	100	100
25	Balachander	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	98	-	98	99	100	100	100
26	mariyaal	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
27	Banupriya	100	100	100	99	99	100	100	100	100	99	99	100	100	-	100	100	100	100	100	100	100	100
28	Senthilkumar	99	100	100	100	99	100	100	-	100	100	100	100	-	100	100	100	100	100	100	100	100	100
29	rathinam	100	100	100	99	100	100	100	100	100	100	100	100	100	-	100	100	-	100	100	100	100	99
30	Anjalai	100	100	100	100	100	100	100	100	100	99	99	100	100	99	100	99	100	100	100	100	100	100
31	Nagaraj	100	100	100	100	100	100	100	100	100	98	98	100	100	100	100	99	-	100	100	100	100	100
32	Devi	100	100	100	100	100	100	100	100	100	98	98	100	-	-	100	99	100	100	100	100	100	100
33	Venkatesan	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	-	100	100	100	100	100
34	Jeyavel	100	100	100	100	100	100	100	100	100	100	100	100	100	99	100	99	100	100	100	100	100	100
35	Sathyabama	100	100	100	100	-	100	100	100	100	100	100	100	100	99	100	100	100	100	100	-	100	100
36	Marie	100	100	100	100	100	100	100	.	100	96	96	100	100.	100	100	100	-	100	100	100	100	100
37	Prabahakar	100	100	100	99	100	100	100	100	100	99	99	100	100	99	100	-	100	100	100	100	100	100
38	Marimuthu	100	100	100	99	99	100	100	100	100	100	100	100	100	99	100	99	100	100	100	100	100	100
39	KalaiSelvi	99	100	99	99	100	100	-	99	100	100	100	100	100	99	100	99	99	99	100	99	99	100
40	murugesan	100	100	100	99	99	100	100	100	100	99	99	99	99	100	99	99	100	99	100	100	100	100

DEXMEDETOMIDINE

SPO2																							
Sl. No.	**Name**	Baseline	5 min	10 min	15 min	20min	25 min	30 min	35min	40 min	45 min	50 min	55min	60min	65min	70min	75min	80min	85min	90min	95min	100min	110min
41	Sakthivel	100	100	99	100	100	100	99	100	100	100	100	100	100	100	100	99	99	100	100	100	100	100
42	Thangavel	100	100	100	100	100	100	100	100	100	100	100	100	100	99	100	100	99	100	100	100	100	100
43	Malar	100	100	99	100	100	100	100	100	100	100	100	100	100	100	100	99	99	100	100	100	100	100
44	Rani	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	99	100	100	100	100	100
45	Jesuraj	100	100	100	100	100	100	100	100	100	100	100	100	100	99	100	100	100	100	100	100	100	100
46	Sivanantham	100	100	100	100	100	100	-	-	-	100	100	100	100	100	100	100	100	100	100	100	100	100
47	Iyappan	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	-	100
48	meghala	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	99	100	100	100	100	100	100
49	Ramya	100	100	100	100	-	100	100	100	100	100	100	100	100	96	98	99	100	98	100	100	100	99
50	Selvam	100	100	100	100	100	100	100	100	100	100	100	100	100	100	99	98	100	100	100	-	100	100
51	ganesan	100	100	100	100	100	100	100	100	100	100	100	100	99	99	99	99	100	98	100	100	100	100
52	Krishnaveni	100	100	100	100	100	100	100	100	100	99	99	100	99	99	99	100	100	98	100	100	100	98
53	Pitchammal	100	100	100	100	99	100	100	100	100	100	100	100	100	99	97	100	100	98	100	100	-	100
54	Manimaran	100	100	100	100	100	100	100	100	100	100	100	100	-	98	99	100	100	100	100	100	100	100
55	Sathya	100	100	100	100	99	100	100	100	100	100	100	100	100	99	99	100	100	99	100	100	100	100
56	Sundar	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
57	Mahamudha	100	100	100	100	99	100	100	100	100	99	99	100	100	100	100	100	98	99	100	100	100	100
58	Manish	100	100	100	100	99	100	100	100	100	100	100	100	100	99	100	100	100	99	100	100	100	100
59	Dinesh	100	100	100	100	99	100	100	100	100	100	100	100	100	99	100	99	99	99	100	100	100	99
60	Kannadasan	100	100	100	100	99	100	100	100	100	99	99	100	100	99	100	99	98	100	100	-	100	100
61	Sivaprakasam	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	99	100	100	100	100	100
62	Vasantha	100	100	100	100	100	100	100	-	-	100	-	100	100	100	100	100	100	100	100	-	100	100
63	Sabarirajan	100	100	100	100	100	100	100	100	100	100	100	100	100	-	100	100	99	100	100	100	100	100
64	Thillairani	100	100	100	100	100	100	100	100	100	99	99	100	100	100	100	99	100	100	100	100	100	100
65	Parthiban	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	98	-	98	99	100	100	100
66	Jayakodi	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
67	Murthy	100	100	100	100	99	100	100	100	100	99	99	100	100	-	100	100	100	100	100	100	100	100
68	Dinesh	99	100	100	99	99	100	100	-	100	100	100	100	-	100	100	100	100	100	100	100	100	100
69	Sathya	100	100	100	100	100	100	100	100	100	100	100	100	100	-	100	100	-	100	100	100	100	99
70	Swaminathan	100	100	100	100	100	100	100	100	100	99	99	100	100	99	100	99	100	100	100	100	100	100
71	Shantha	100	100	100	100	100	100	100	100	100	98	98	100	100	100	100	99	-	100	100	100	100	100
72	Venkatesan	100	100	100	100	100	100	100	100	100	98	98	100	-	-	100	99	100	100	100	100	100	100
73	Sivagami	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	-	100	100	100	100	100
74	Dhanam	100	100	100	100	100	100	100	100	100	100	100	100	100	99	100	99	100	100	100	100	100	100
75	Devagi	100	100	100	100	-	100	100	100	100	100	100	100	100	99	100	100	100	100	100	-	100	100
76	Shyama	100	100	100	.	100	100	100	.100	100	100	100	100	100.	100	100	100	100	100	100	100	100	100
77	Gomathy	100	100	100	100	100	100	100	100	100	100	100	100	100	99	100	-	100	100	100	100	100	100
78	Kavitha	100	100	100	100	99	100	100	100	100	100	100	100	100	99	100	99	100	100	100	100	100	100
79	Jayaraman	99	100	99	99	100	100	-	99	100	100	100	100	100	99	100	100	99	99	100	99	99	100
80	Bhuvaneswari	100	100	100	100	99	100	100	100	100	100	100	100	100	100	99	100	100	99	100	100	100	100


82
100
18
110 74